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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

No. 1371
No. XXVII

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

SIXPENCE
EVERY THURSDAY

FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

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Trans-oceanic

REPORTS are plentiful of schemes for commercial air services across the Atlantic and the still mightier Pacific. One of these reports says that a company named the Great Lakes Newfoundland Atlantic Corporation, Ltd., has been formed with a capital of ten million dollars to establish a regular eight-and-a-half-hour air service between Galway Bay and Mortier Bay, in Newfoundland. Pan-American Airways, in conjunction with Imperial Airways, hope to start an air service between Bermuda and New York before the end of this year. A British flying-boat for this service is in the design stage, but the Americans are more advanced. Pan-American Airways, whose designs are always to be examined with respect, are also planning a service across the Pacific from California to China. According to a New York correspondent of the *Daily Telegraph*, this route of 8,500 miles is to be operated by making refuelling stations at Honolulu, two tiny coral atolls known as Midway Island and Wake Island, a larger island named Guam, and Manila. These stages are anything from 1,242 to 1,500 miles long, and wireless devices will have to give of their best if the flying-boats are to make their way across with certainty.

Meanwhile, the proposed British new route from Singapore to Hong Kong is being prepared. Col. J. F. Turner, Director of Works and Buildings at the Air Ministry, has been making a tour by flying-boat over the route, and has approved sites for six aerodromes in Sarawak and British North Borneo. Their names may become famous before long, so we will put them on record. From South to North they are: Kuching, Bintulu, and Miri, in Sarawak, and Labuan, Jesselton, and Kudat in British North Borneo. In the Philippines there are already aerodromes at Palawan and Manila. Why aerodromes are needed on what looks to be essentially a flying-boat route does not appear. It is, however, amusing to note that Reuter, in reporting the choice of these aerodromes, remarks that this route may serve as the final link in the Pacific air service being planned by the United States, as described above. Presumably Imperial Airways and Pan-American Airways can come to terms on the Pacific as well as on the Atlantic.

One may be inclined to ask what oceans are left for Britain, once the mistress of the seas, to conquer. The French and Germans have established themselves (though not yet perhaps to the point of paying dividends) on the South Atlantic. The Americans are at least ahead of Britain in plans for the North Atlantic and the Pacific. British flying-boats are crossing the Mediterranean and British landplanes the Timor Sea. Soon, it may be hoped, the formidable Tasman Sea will also see British aircraft plying regularly across it. But if we are to strike out a line for ourselves across oceans as apart from seas, we must look well ahead. The Indian Ocean remains uncrossed by air lines. Before the R101 disaster, British airship authorities used to speak of the possibilities of a service between Durban and Perth, where the trade winds would help to save fuel in both directions. The distance is about 5,000 miles, with a couple of small islands to be found halfway across. At present there is no great volume of trade between Natal and Australia, but who knows when that will develop? Airships might actually save time by flying from England to Australia *via* Durban. But, if we ever come to tackle that crossing of the Indian Ocean, the probability is that we shall find Dr. Eckener there before us.

The £25,000 Competition

NO official pronouncement having yet been made concerning the details of the competition for the £25,000 prize announced by Sir Philip Sassoon in connection with the Air Estimates Debate in the House of Commons recently, to which we referred last week, it may be of interest to examine the subject a little more closely, and, if possible, find a basis which may reasonably be expected to produce the greatest possible benefit from the prize offered. The actual expression used by Sir Philip in mentioning the offer

was that it was to be for "the best machine produced by a British firm within a stated period of time and complying with certain broad requirements to be formulated by the Air Ministry."

As we pointed out last week, a clear definition will have to be given of what is meant by "best." Does the expression mean the machine with the highest cruising speed, or with the best take-off, or with the widest speed range, or with the greatest degree of comfort for the passengers, or with the greatest pay-load per horse power, or what? One actually assumes, of course, that "best" is meant to cover a combination of all such features. The many desiderata could probably be worked into some sort of formula, but competitions based on formulæ have a habit of producing machines which excel in one particular respect at the expense of other and quite as important features. We take it that this is not what the Air Ministry has in mind, but that all-round excellence is the ideal to be aimed at.

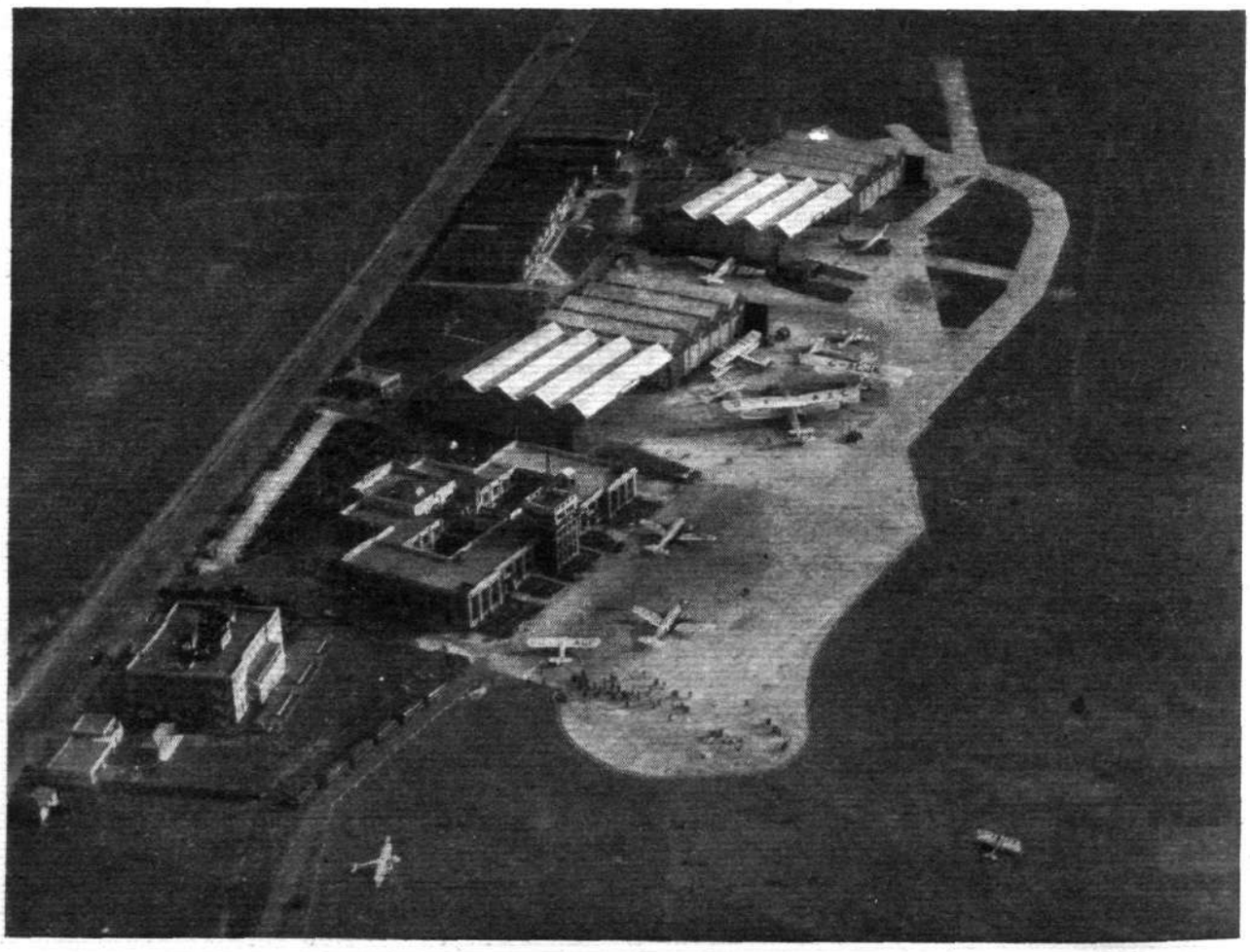
Two Competitions?

Present indications are that the intention is for the Air Ministry to formulate "certain broad requirements" with which competing machines will have to comply. We are very much against "broad requirements." The sentiment behind them is admirable, and indicates a willingness to give designers a free hand, but in practice the broadness is likely to mean vagueness in the regulations and difficulties in their interpretation. A fairly recent example of this sort of thing occurred in connection with the MacRobertson Race, in which, originally, the regulations stated that machines should conform "substantially" to I.C.A.N. requirements. We feel that, above all else, it is necessary to be specific and precise.

Although the man who pays the piper calls the tune, we feel it would be well to get as many brains as possible concentrating on this particular subject. Only a limited number of aircraft firms will be able to design and build machines for the competition. Many of the smaller firms will not be able to afford it. To give them and the operators an opportunity, and to encourage some of our younger designers, why should the prize not be divided into two separate awards, one for specifications and one for the actual machine winning the competition?

Striking an Average

As we see it, in the competition specifications would be given all the main features which the producer of the specification considered important. The award of this prize, which might be of £3,500 or £5,000, for the sake of argument, might go to the specification which incorporated the maximum percentage of features asked for in all the specifications. In that way one might gain a good idea of what, by consensus of opinion, constituted the most desirable characteristics—in other words, the machine likely to meet with the requirements of the greatest number of operators or potential operators. We do feel that every effort should be made to obtain the views of as many operators as possible. Having selected the winning specification it would be open to firms to build for the main competition their interpretation of the specification.



METROPOLITAN AIRPORT: An unusual view of our chief airport, Croydon, taken by a *Flight* photographer on one of the aerodrome's normal working days. The layout of the administrative buildings, the hotel, the hangars and the apron can be clearly seen, and Purley Way, with its tall lamp-standards, runs behind the buildings. Modern airport layout is discussed in articles in this issue.

The Outlook

A Running Commentary on Air Topics

A Record Homecoming

ONCE again the Australia to England record for solo pilots has been handsomely beaten by an amateur pilot with a machine which, though experimental, can be considered to have been "bought off the shelf." Mr. Brook's time with the original Miles "Falcon" may not appear very spectacular to those who have become inured to "Cometary" and other speeds, but it must be remembered that the machine had a cruising speed of barely 130 m.p.h. and that the pilot carried the whole job on his shoulders.

Two particular facts appear to provide one particular lesson. Mr. Brook was not overtired when he arrived in England, and his machine was of the cabin type. Those are the facts which suggest that the cabin machine is less tiring than the open type to fly over long distances. Certainly this new record-breaker's attitude will tend to prevent others from showing too marked an appearance of fatigue at the conclusion of such a flight! But Mr. Brook was comparatively lucky with his weather.

Approaches

IN spite of the fact that engines are now within a fraction of being a hundred per cent. reliable, it is still considered necessary that novice pilots should learn to approach an aerodrome on subconscious make-believe forced-landing lines. In other words, the throttle is closed comparatively close to the boundary, and a series of S-turns made with one eye on the fence and with the idea of slipping-off the last hundred feet or so.

However useful such tactics might be in the case of a real forced landing, the time has come for a complete modification of the system and the majority of instructors are teaching their pupils to make the "first solo" type of approach. Aerodromes are often too crowded for S-turns to be made in the vicinity, and, in any case, S-turns and sideslips are forbidden at large airports.

With varying wind speeds it is practically impossible for the experienced pilot to judge a straight approach to within a vertical fifty feet, and the amateur is left with the necessity for a "rumbling" approach—perhaps half throttling his engine until the appearance of the boundary is unmistakably "right." Certainly this practice is less dangerous than that of using a short burst of full throttle at the last minute—even the best of engines will become cold and choke if the throttle is opened.

Aerodrome Congestion

INCIDENTALLY, some of the aerodromes near London, apart from Croydon, which is devoted to commercial work and can, therefore, be fully controlled, are becoming almost dangerously crowded. At several of the schools commercial, demonstration and test work is all being carried on simultaneously, and the sight, for instance, of a two-hundred-mile an hour machine with a flat glide whistling in beneath a trio of school machines while two other commercial types are being taxied out for a take-off is more than disturbing to everyone but the pilots concerned. Curiously enough, when actually flying in a machine the confidence in one's general view is quite out of proportion to the view itself, and no one is more surprised than the pilot when his passenger points out a large and prickly machine on the port bow—just behind the centre section. At one aerodrome two separate circuits are actually being made while odd lawless people dash around for the benefit of passengers or photographers.

Certainly rules are made to be broken, but all the little things concerning circuits and turns that one learns for the *viva voce* licence examination will presently need to be properly remembered if collisions are not to become more common. Unfortunately, though the air is boundless, machines operate at much the same height and approach an aerodrome from the same angle—though from different heights according to their relative gliding angles.

Pump-driven Instruments

ATTENTION has already been drawn in these columns to the need for driving instruments from some form of engine-driven vacuum pump, particularly in the case of those necessary for "blind" flying. Not only do external venturi tubes cause excrescences which make the aeroplane slower than need be, but they are liable to become iced-up just when the instruments are most needed.

Recently, when Mr. Parkes, of Airwork, Ltd., was returning from Teheran with a "Dragon" he found his wings icing-up over high mountains. He climbed higher into the clouds, but the only result was icing-up of the artificial horizon and directional gyro venturis, so he was forced to land in a valley which he providentially found below him at an altitude of 6,400ft.

If all aircraft manufacturers who fit external venturis were subjected to experiences like this, we should soon have aeroplanes better fitted to fly in any weather conditions.

Flying Boats and the Fleet

CRUISING on the trade route over a hundred miles south of the Canaries during the recent naval manœuvres, H.M.S. *Queen Elizabeth* was passed and greeted by a large flying boat, which proved to be a German passenger craft on her way from Cadiz to South America. The incident aroused reflections in those on board the battleship, and the correspondent of *The Times* expressed surprise that no flying boat units form part of the Fleet, as does the Fleet Air Arm. He voiced a plea that the Navy should have some flying boat squadrons at its entire command, on the ground that in war the flying boats would work entirely with the Fleet, and that, as their range is much greater than that of ship-planes, they would help to make good the deficiency in cruisers.

Flying boats are still in a state of development, but the largest yet envisaged is not sufficiently seaworthy to be able to accompany the Fleet into the open ocean out of reach of shore bases in really bad weather. In fine weather, when they could be refuelled at sea, they would doubtless be very useful. If the Admiralty, after due consideration of the powers and limitations of flying boats, decided that it would be an advantage for the Navy to have some squadrons of them at its entire command, this could doubtless be arranged on the analogy of the Fleet Air Arm. At present the chief functions of flying boats in home waters are patrol and search for enemy vessels. Apart from that, the Air Ministry certainly needs a number of flying boat squadrons for its own purposes, which cannot be called entirely naval in character. As long-range craft they are a connecting link between different parts of the Empire, and the time has not yet come to consider a change in the present arrangement.

THE AIRPORT of TO-DAY

Some General Observations on the Establishment of Passenger Aerodromes to Serve Towns : The Problem of Site Selection from Practical Angles

ONE of the most fashionable diseases in to-day's political, economical and international arenas is the vicious circle. If, say the experts, this is done, then *that* will follow, and our position will be even worse; let us, therefore, sit tight in the hope that matters will clear themselves up.

Nowhere is the vicious circle more obvious than in the case of airport development. Until fully equipped aerodromes are established it is impossible for the operator to organise services or for the private pilot to use his machine, and, until the operator starts a service, the municipalities, thoughtful of the ratepayers' money, refuse to lay out an aerodrome. Only the most sanguine ever imagined that to-day, or even to-morrow, there would be an adequate, if invisible, return for the money spent—no municipality, after all, expects to reap much more than expressions of gratitude for the planting of the flowers in a public park.

All things considered, the fact that there are now a score of municipal aerodromes in existence and some ten sites purchased, apart from a very fair number of independent aerodromes and landing grounds, is a matter for congratulation. Local enthusiasm, in the form of projected flying clubs, has played no small part in encouraging the various City Fathers to push the schemes ahead. Those who fear that an airport will remain a white elephant for a number of years would do well to examine private flying potentialities by way of a start.

A *Flight* artist's conception of the airport of to-day—as it might In the arrangement shown the administrative buildings form

The Importance of Radio

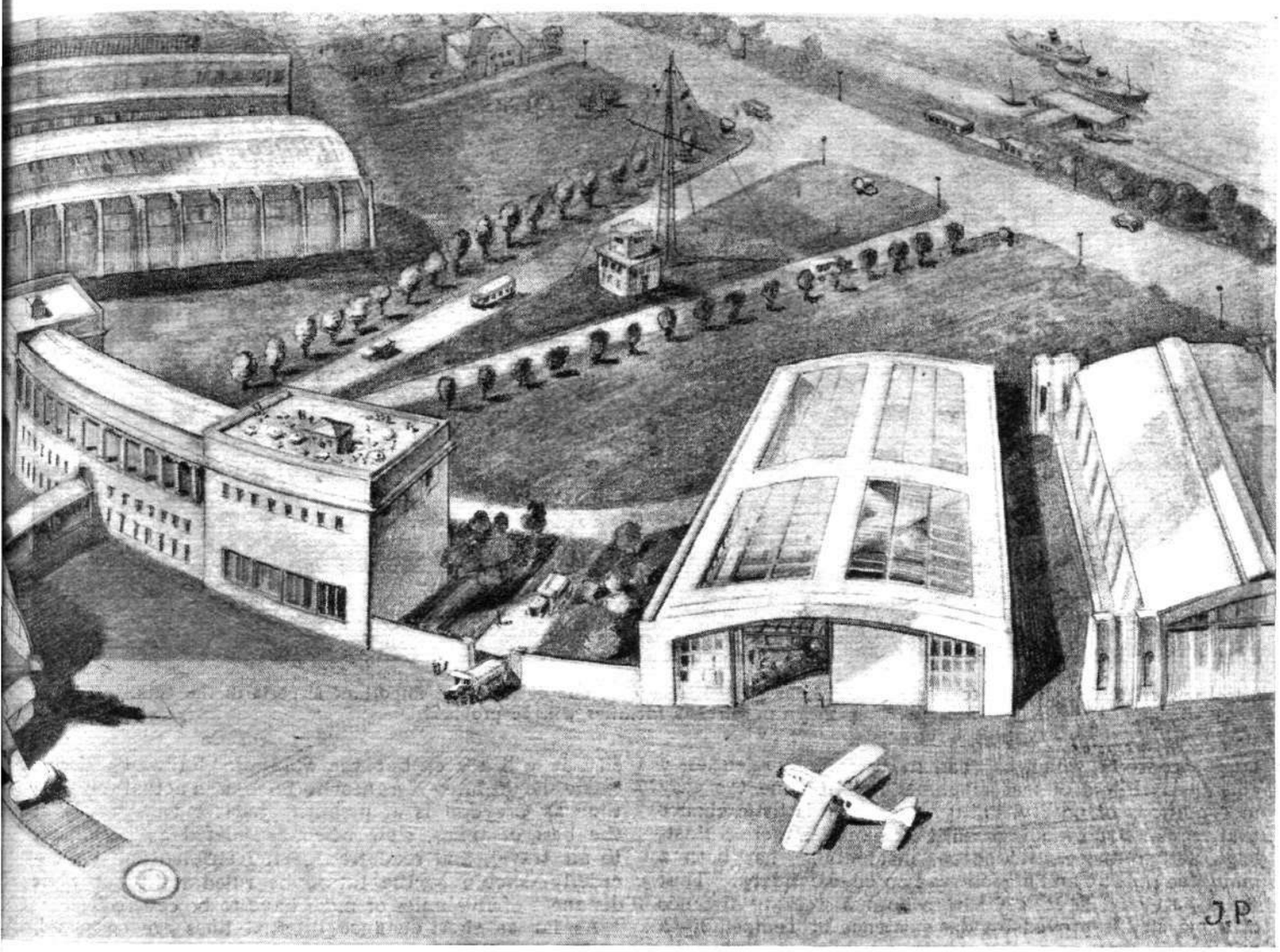
Meanwhile, the airport supporters await the projected air lines and the air-line operators await meteorological and full radio facilities before making a serious endeavour to provide 100 per cent. winter and summer reliability. One might almost liken a series of airports without radio facilities to a series of railway stations without rails—though in this case, of course, the trains must be imagined as being capable of getting along from station to station in reasonably clear weather. Any amateur who has attempted regular journeys across the Pennines during the winter months knows exactly how impossible a regular schedule would be without those "rails." As it is, the K.L.M. looks on its Hull-Liverpool leg as a blind-flying section, even during the summer.

Nevertheless, the larger municipalities, with one eye on the definite future, should look on airport development as being, to quote Mr. H. E. Brooke-Bradley, fundamentally a phase of town planning. The Air Navigation Act of 1920 empowers local authorities to establish and operate aerodromes; the Public Works Facilities Act of 1930 allows compulsory powers of purchase; and Acts of 1925 and 1932 give control of all surrounding development.

Aerodromes may be comfortably divided into a dozen types, but, for the sake of simplicity, we may cite certain definite examples from which "crossbred" types may be imagined. These are: (a) Terminal airports, provided with all possible facilities for internal and international services; Croydon may be taken as being typical of this class. (b) Municipal or intermediate aerodromes, with or without complete facilities; Portsmouth provides a good example. (c) School or club aerodromes; laid out originally for the pleasure and profit of the private pilot, such aerodromes may attract the air-line operator, the manufacturer or the sales organisation. Broxbourne aerodrome is another example selected at random. (d) The private aerodrome, varying from the simple field and hangar of the private owner to the testing aerodrome of the manufacturer and the operator's terminal airport. Heston airport, for instance, laid out originally as an exclusive haven for the private pilot, became in two years one of the most important terminal air-line airports. Essex airport, Stapleford Abbotts, on the other hand, is primarily the operational and maintenance centre for one company. The permutations and combinations are almost unlimited. It has often been pointed out that a large field, a shed, fuel supplies and a windsock are all that are necessary for a modest start so long as space is allowed for future development.

Minimum Sizes

Before proceeding to deal with airport features in detail, a few general comments will not come amiss. The Air Ministry stipulates that a public aerodrome for general use must have no runs less than 600 yards, while a limited licence can be obtained for an aerodrome with runs of no more than 400 yards so long as the ground within 100 yards of the perimeter has no obstruction higher than a 3 ft. fence. Such an area would be between 100 and 150 acres in size. The average gradient must not exceed 1 in 50. The effect of surrounding obstructions is taken into consideration, but so long as the flying gaps are wide enough these need not form an insuperable diffi-



hines taxi on to a covered turntable in front of the terminal buildings and passengers remain under cover until they leave the airport. rthead of the layout, and the control officer has his "nest" on the turntable roof, obtaining a clear view in all directions.

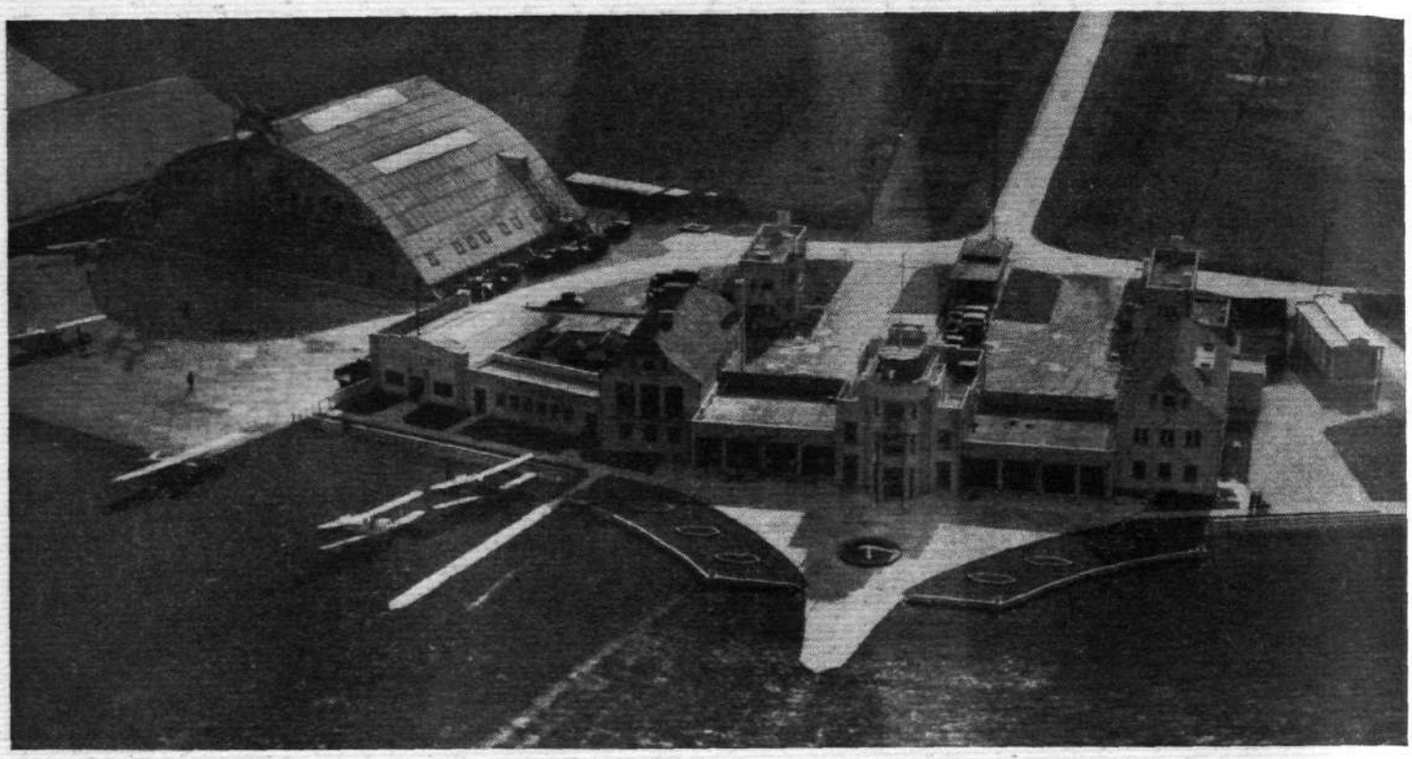
culty. It is worth remembering, however, that, with modern aeroplanes, any obstruction on the boundary reduces the effective landing run from that direction by at least ten times the height of the obstruction itself—and glides become flatter as aeroplanes become faster. Actually, allowance should be made for runs of at least 800-1,000 yards in the most important directions.

An aerodrome site should be as near as possible to the centre of the town to be served, and, if possible, on the prevailing windward side so that smoke is not blown in its direction. In the case of large towns a compromise must be arrived at as far as position is concerned. If the airport is too far from the centre, surface transport time becomes an unreasonable factor, and, if it is too near, the air services themselves may be hampered or delayed by bad weather coupled with the necessary proximity of chimneys and so forth. With the development of radio blind-landing systems weather will have less effect on schedules, and only one wide channel between obstructions will be really necessary—though, of course, high winds, making a particular channel valueless, are often accompanied by unpleasantly low clouds. So far as weather conditions are concerned, the ideal position is a plateau such as that on which the R.A.F. aerodrome at Biggin Hill is situated. Biggin Hill is sometimes used by air services when Croydon is impossible. However, the whole question is a matter for the town planner and for the meteorological and other experts. The best foundation, as far as drainage is concerned, is sand and gravel or chalk. An excessively flat site increases the drainage problem.

If the prospective airport owner does not intend his ground to be, for the time being, absolutely full size, it is essential that land on at least two sides should be reserved for future extensions. Schiphol Airport, Amsterdam, provides a singularly apposite example. Although it is amply large at present, the authorities have reserved some 450 yards to the south-west and some 900 yards to the north-west for the day when either twice as many machines are arriving every hour, or in case landing speeds are higher and approach angles are flatter. In any case, the reservation allows complete control over nearby development, and this is particularly important now that Amsterdam is equipped for blind landings.

Ground Transport

The question of present and future surface transport connections should not be forgotten. It is advisable that a site should be near, but not too near, a main arterial road, and, perhaps, particularly if manufacturing support is expected, near a main line railway. If a main road or railway passes the actual boundary, the telegraph wires, if not carried underground, and the road lighting standards will upset the approach from that direction. Telegraph and high-tension wires are always given a wide berth by pilots when the visibility is not too good. The business of running such cables underground, such as is done at Dyce Airport, can be expensive, but is exceedingly necessary. Croydon, with its comparatively "heavy" terminal building and hotel, its haphazard hangar layout, and with the building development on the actual boundary, is an excellent but perhaps inevitable case of an amply



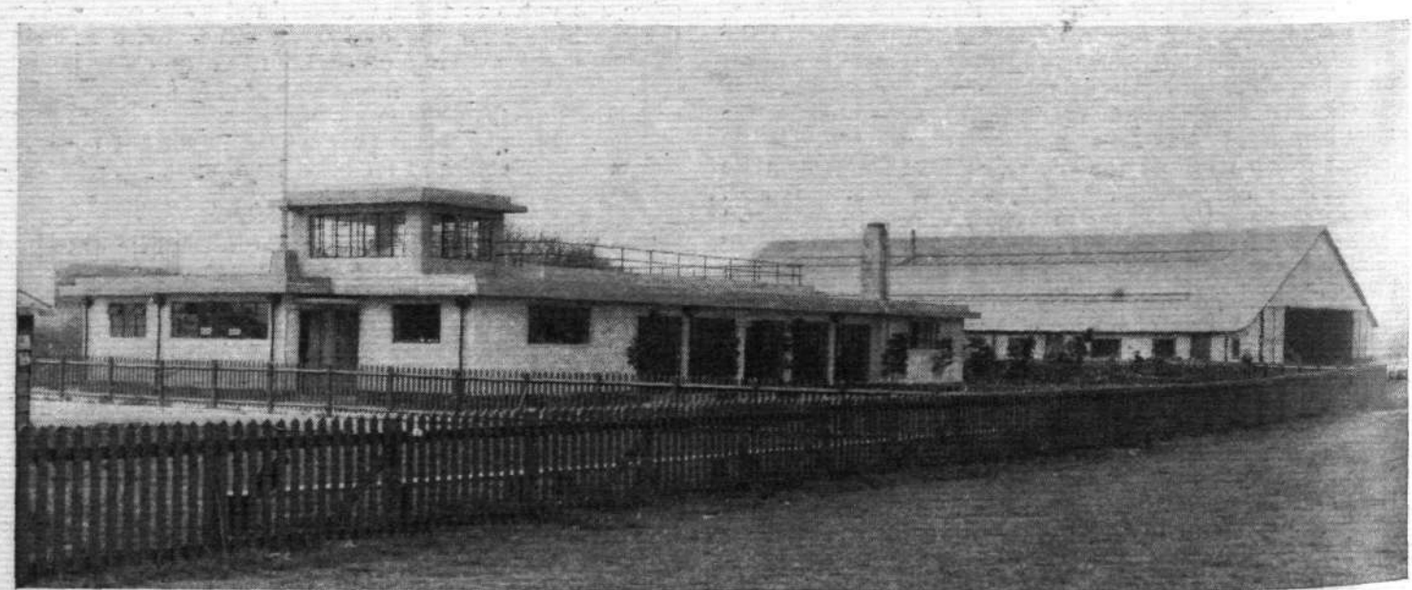
Heston, originally planned to attract the private pilot, has become one of the most important airports in the country. This month full wireless facilities will be provided.

large aerodrome which has had its useful size relentlessly curtailed. Pilots of fast machines find it none too easy in conditions of poor visibility, and there is little chance that regular blind landings will ever be made there. Eastleigh aerodrome, Southampton, incidentally, has both a main line railway and a good road on one boundary. That an airport *can* be almost within normal walking distance of a big city is proved by the existence of Tempelhof—a military parade ground "caught while young" by the authorities—within three miles of the centre of Berlin. It is true that there are tall buildings in the vicinity, but approach areas on all but one side have been left almost clear as sports grounds and cultivated areas.

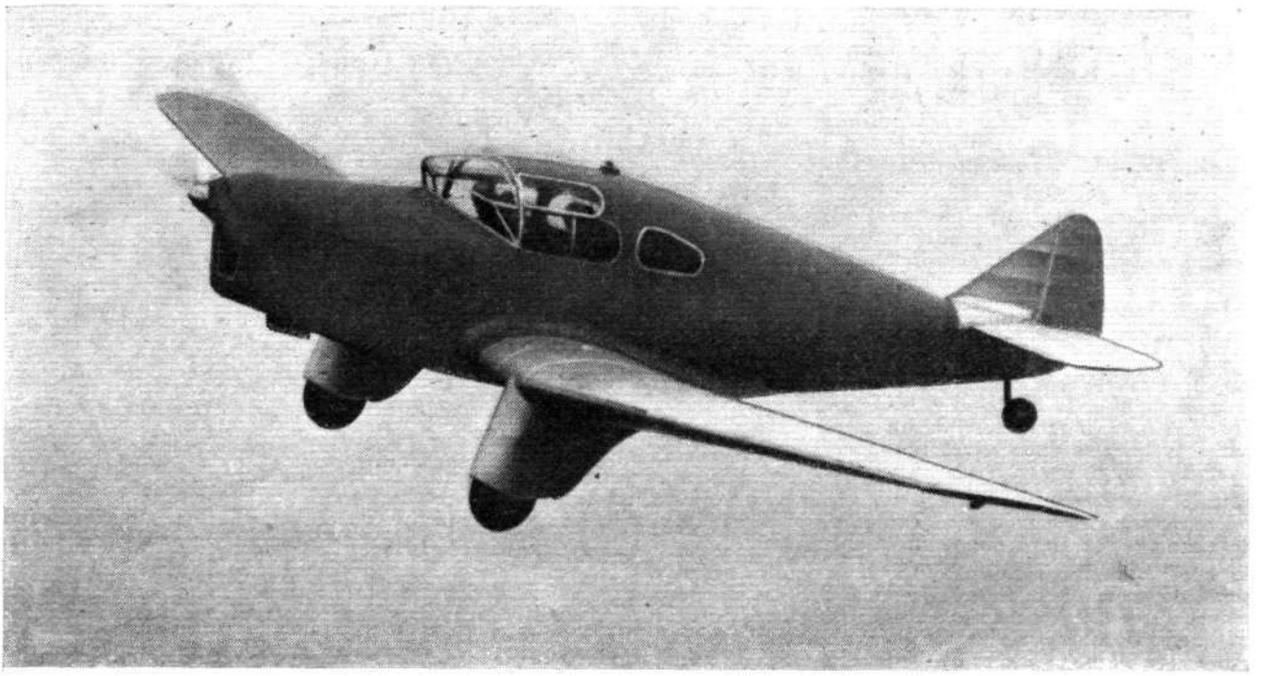
If really good ground or underground transport facilities are provided, the distance from the centre does not, however, mean a very great deal. Gatwick aerodrome, which is to be fully developed this summer, cannot by any stretch of the imagination be considered to be near the city it will serve, but the Southern Railway's electric trains should bring it as near to London in actual travelling time as Croydon is at present. Surface transport is, at the best of times, slow when considered as an adjunct to air travel, and road transport, restricted and yet disorderly, should in the future be ruled right out where distances of five miles or more have to be covered.

As far as short-distance internal lines are concerned, surface facilities become the crux of the situation unless the air-line provides an unusually great saving of time in itself. A fast commercial machine, for instance, may fly from London to Manchester in rather less than an hour and a half, yet the ground transport at both ends may total something like eighty minutes.

These, then, are the wider aspects that govern site selection. Some points of interest in the matter of site preparation, and aerodrome construction generally, will be found in the article on pages 354-360.



The buildings at Portsmouth airport indicate what can be done at a comparatively small cost. There is a restaurant for passengers and public in the main building, from which they can view the landing ground.



THE MILES "MERLIN"

New Five-seater with "Gipsy Six" Engine and Very Complete Standard Equipment: High Performance with Economical Running Indicate Fitness for Taxi Work

NOT many months pass without rumours of yet another new machine about to be produced by Phillips and Powis at Reading. This firm has been in existence as aircraft constructors for only a little over a year, but already it has produced the "Hawk," "Hawk Major," "Hawk Racer," "Falcon," and now the "Merlin." Mr. Miles, the firm's designer, is, incidentally, probably unique in the aviation industry, as he has, in his drawing office, the help of his wife; Mrs. Miles is, with him, equally responsible for the originality and success of the machines they have designed and built.

The "Merlin" is the outcome of collaboration between the constructors, Flt. Lt. G. Birkett (Birkett Air Service, Ltd.) and the Tata interests, who operate extensive air lines in India. The first model is being delivered to Flt. Lt. Birkett for his taxi services. It is particularly interesting as, with the exception of racing machines, it is the first standard British civil aeroplane to be designed to use a controllable-pitch airscrew, and it is also being marketed with an unusually full equipment—a commendable feature which we hope to see become general practice.

In view of these features, let it not be thought that the "Merlin" is suitable only for the commercial operator. That is far from the case; it should prove equally attractive to the private owner who wishes to buy a machine with a high performance, and one which is ready to go anywhere at any time without the necessity for extra equipment being purchased.

In general, the "Merlin" is a development of the "Falcon" (described in *Flight* of January 10)—a machine very much in the news at the present time owing to Mr. Brook's record flight in the prototype from Australia. The seating accommodation has been increased so that five persons can now be carried in perfect comfort, one beside the pilot in front and the other three on a sofa seat behind. Furthermore, the luggage locker, which lies immediately behind and slightly above this latter seat, is deep enough for a stretcher case to be carried, and a patient can be transported without removal from the stretcher.

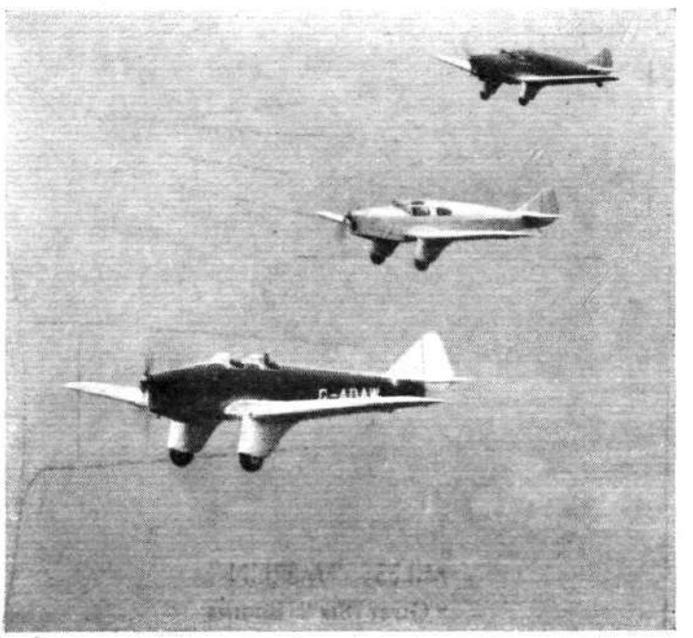
Structurally, the "Merlin" is a low-wing wooden-built monoplane with box plywood and spruce spars, plywood-covered wings and fuselage, and cantilever undercarriage; it differs from the earlier Miles machines in small details only. The span of wing has been increased, and this has resulted in an increase of the taper and aspect ratio. A further departure from the "Falcon" is an increase of the dihedral angle of the wings to 7 deg., which has had the effect of making the "Merlin" very stable and comfortable to fly.

The general design of the cabin is very like that of the "Falcon"; the forward-sloping windscreen has been retained, as has the neatly hinged cabin door, while large windows on each side of and above the seats make the cabin particularly light and give a pleasantly "airy" impression.

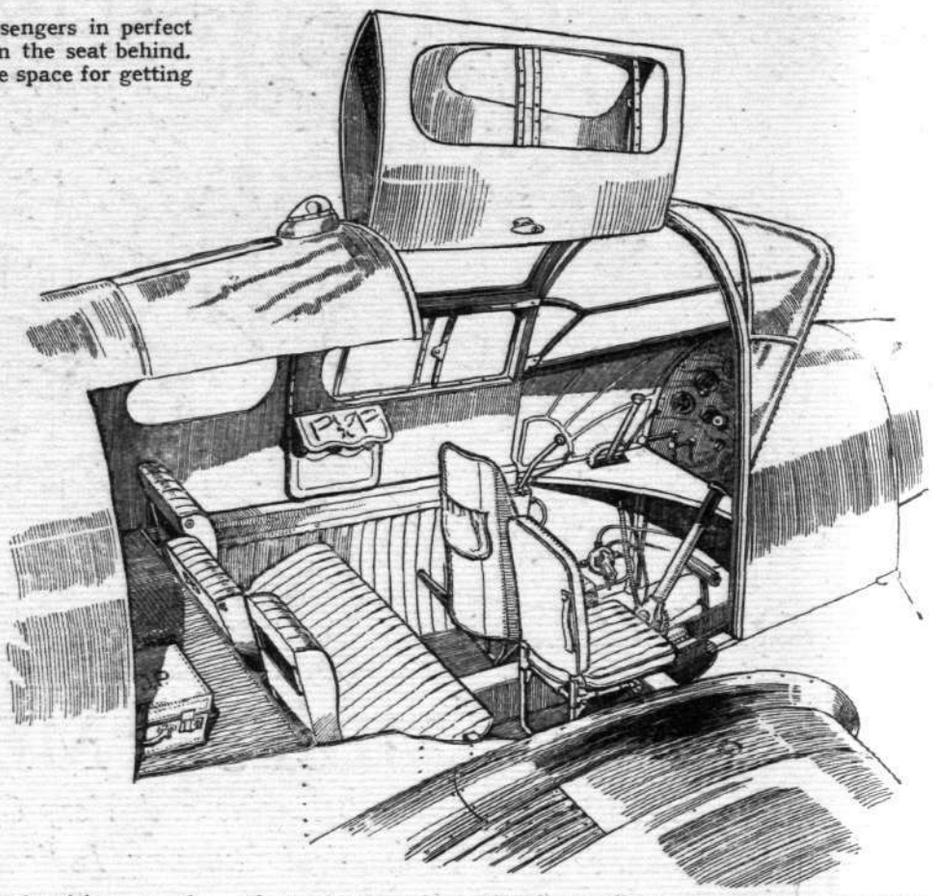
The engine, a D.H. "Gipsy Six," is carried on a welded-steel-tube mounting, and the neat cowling which surrounds it is obviously responsible to no small extent for the exceptional performance of the machine.

Like all modern P. and P. machines, the "Merlin" is fitted with the Miles wing-flap gear, which is hydraulically operated by a small quick-acting pump near the pilot's left hand.

A short flying trial soon showed that the "Merlin" is a



Genesis: This photograph, taken by a *Flight* photographer from a standard "Hawk" (Cirrus III), shows the "Hawk Major" (Gipsy Major), the "Falcon" (Gipsy Major) and, at the top, the "Merlin" (Gipsy Six).



The cabin of the "Merlin" seats four passengers in perfect comfort, one beside the pilot and three on the seat behind. The door slides up easily and allows ample space for getting in and out of the cabin.

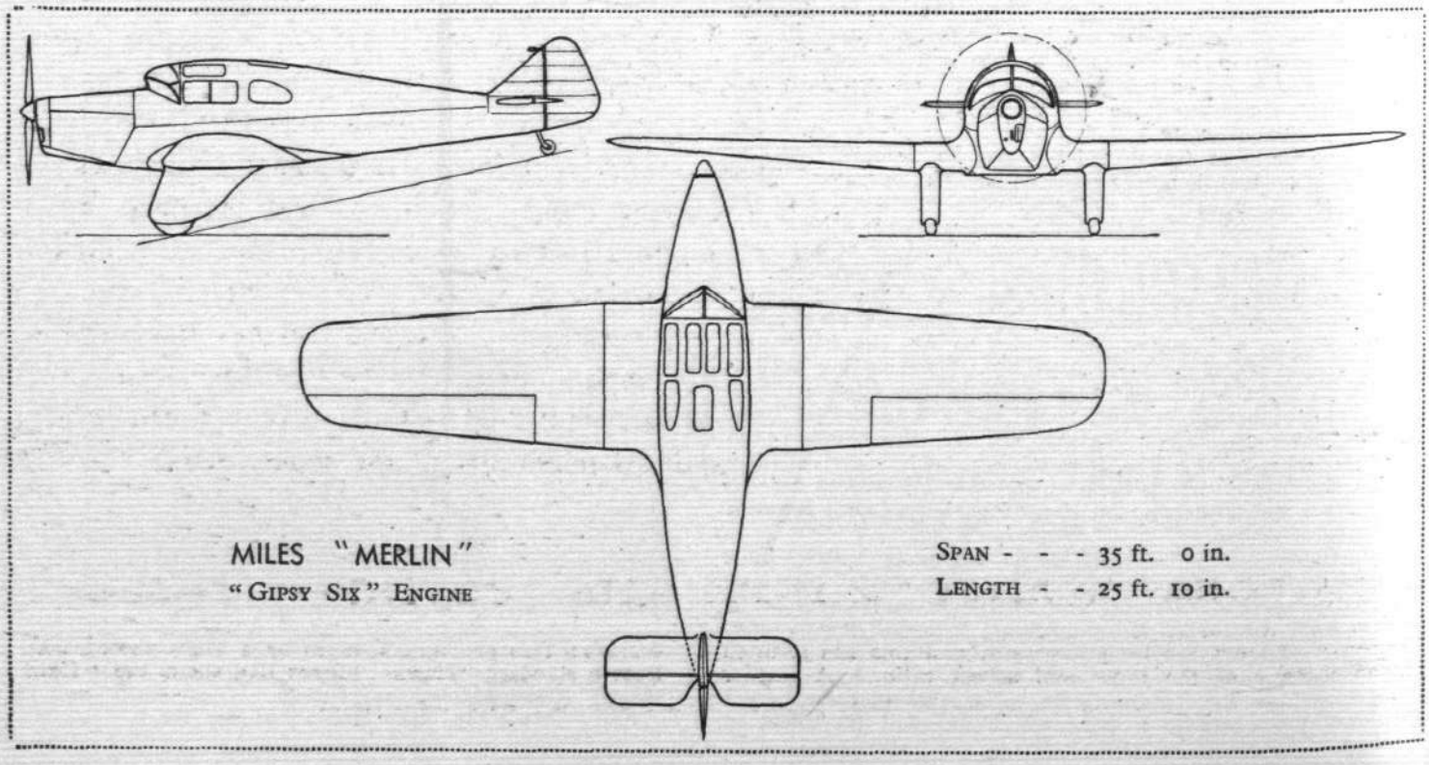
very considerable advance over anything which Mr. Miles has yet designed. In spite of the fact that the new Ratier controllable-pitch airscrew was not then available and that a standard wooden airscrew had to be used, the performance was quite outstanding. With five people and full tanks the take-off was below the two-hundred-yard mark, and with flaps down the landing speed was, by A.S.I., about 46 m.p.h. In the air it is at once noticeable that the increased dihedral of the wings gives that high degree of positive lateral stability which, we consider, is a desirable feature of commercial aeroplanes. The "Merlin" can be flown "hands-off" for long periods with perfect safety, even without the feet on the rudder-bar; in other words, directional as well as lateral stability is ample and definite. Furthermore, we are assured by the designer that bumps are corrected without any undue lurching, so that the machine may be considered as one which can be safely left to fly itself while maps are examined or lunch is eaten. This is a very desirable feature, particularly when it is combined with a high degree of manœuvrability, and when, as in the "Merlin," the fin areas are so proportioned that turns can be made without touching the rudder.

The occasion of our flight was one of fine drizzling rain, so it was possible to prove the practicability of the unusual windscreen design; it was extremely pleasing to find that there was no difficulty at all in sitting forward so as to get very near the windscreen—a great help in conditions of this kind.

Another Attractive Feature

As can be seen from the table on p. 353, the ratio of gross weight to tare weight is unusually good for this class of aeroplane, thus there is yet another reason why the machine should prove admirable for taxi operators. That is really just what would be expected when it is known how the Merlin" came to be conceived. Even with the high percentage payload which can be carried—in the present model the figure is about 800lb.—the range is excellent, the tankage for forty-four gallons of fuel permitting journeys of about 800 miles without refuelling, and when the controliable-pitch airscrew is available both this and the cruising speed will probably be improved.

The last truly commercial aeroplane—that is, one which enabled operators to make profits—to be built as the direct outcome of a designer giving an operator what he asked for was, perhaps, the D.H. "Dragon." This was designed as a result of collaboration with the late Mr. E. Hillman, and proved to be one of the most successful machines of recent times. It is interesting to note that it was built of wood just after a phase when most machines were built in metal. Now we have the "Merlin," also built in similar circumstances and also of wood; if it finds as much favour among operators abroad as has the other, it will certainly appear that



MILES "MERLIN"
"GIPSY SIX" ENGINE

SPAN - - - 35 ft. 0 in.
LENGTH - - 25 ft. 10 in.

MILES "MERLIN"
"GIPSY SIX" ENGINE

Dimensions.

Span	35ft. (*10,67 m*)
Chord	77in. (*1,96 m*) tapering to 49in. (*1,25 m*)
Length	25ft. 10in. (*7,87 m*)
Height	7ft. 5½in. (tail down) (*2,27 m*)
Cabin	width 49in. (*1,25 m*), length 79in. (*2,01 m*), height 44in. (*1,11 m*)
Locker	width 45in. (*1.14 m*), length 31in. (*0,79 m*), height 23in. (*0,58 m*)

Weights.

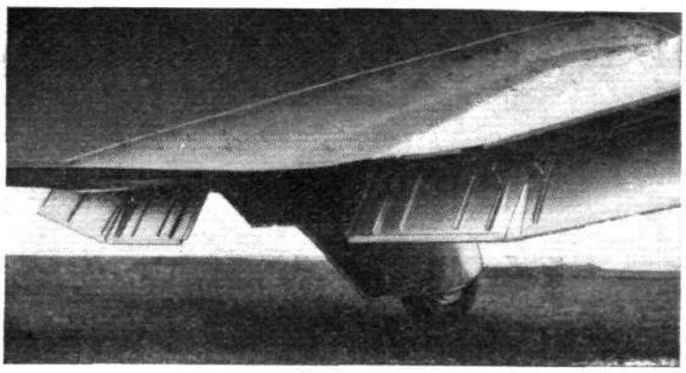
	lb.	*kg*
Tare	1,576	(*714,9*)
Pilot	160	(*72,6*)
4 passengers	640	(*290,3*)
44 gall. petrol	339	(*153,8*)
32 gall. oil	35	(*15,9*)
Luggage	150	(*68,0*)
Wireless	100	(*45,4*)
	3,000	(*1,360,8*)

Performance (with ordinary wooden airscrew).

Top speed	155 m.p.h. (*249,5 km/h*)
Cruising speed	140 m.p.h. (*225,3 km/h*) at 2,100 r.p.m.
Landing speed	48 m.p.h. (*77,2 km/h*)
Ratio, gross weight to tare weight	1.9

Equipment

V.P. airscrew (new type Ratier), self-starter, landing lights (Harley's), navigation lights, wireless (this is standard, but the price varies according to the set used), turn and bank indicator (ditto).



The wing flaps on the "Merlin" effectively steepen the glide and enable full control to be retained at very slow speeds.
(*Flight* photograph.)

the old argument that aeroplanes for abroad had to be of metal has ceased to carry any truth.

In conclusion, the completeness of the equipment is again worth mentioning. The controllable-pitch airscrew will, as soon as it is available, enhance the already outstanding performance; the electric starter, navigation lights, and landing lights built into the leading edge are what we hope to see as standard on all aeroplanes before long.

The Mayo Composite Aircraft

In connection with the Mayo Composite Aircraft Co., Ltd., the formation of which was recorded in our last issue, the board of directors has now been announced and is as follows: Sir Harold E. Snagge, K.B.E., M.A., J.P., chairman; Mr. Kenneth A. E. Moore, F.C.A.; Mr. Hugh Burroughes, A.F.R.Ae.S.; Air Vice-Marshal A. E. Borton, C.B., C.M.G., D.S.O., A.F.C.; Major R. H. Mayo, O.B.E., M.A., A.M.Inst.C.E., F.R.Ae.S., and Major John Stewart, O.B.E. The registered offices are at 18, Austin Friars, London, E.C.2 It is not intended to manufacture aircraft.

UNDER ARREST

Arrester gear is as old in its conception as the idea of landing on the deck of an aircraft carrier, though the early forms, which made use of sandbag-weighted ropes, did not prove very successful; consequently these systems were gradually dropped in the Fleet Air Arm as the technique of landing on a bare deck was improved. More recently other countries, America in particular, have revived forms of arrester gear, presumably on the score of higher landing speeds, and our photographs show the latest type of arrester gear which is being used by our own Naval air service. The pivoted hook under the rear end of the fuselage catches in the cables stretched across the deck.

PRACTICAL AIRPORT EQUIPMENT

Construction and Layout : Runways : Hangars : Control Systems : Lighting : Modern Methods in Use at Home and Abroad

AIRPORT layout and equipment is a subject which, to use a hackneyed phrase with real justification, would fill many books. In the following pages, however, an attempt has been made to cover the salient points and to quote some of the more representative items of equipment. Studied in conjunction with the general article which will be found on pages 348-350, the points dealt with will serve to give prospective airport owners some idea of the many problems which have to be faced and of the way in which they have been tackled and overcome in various aerodromes at home and abroad.

The site having been selected, the work of levelling, draining, seeding, and the layout of aprons and even of runways is a matter for the respective specialists. Large areas such as aerodromes require a carefully planned drainage system, and that generally employed consists of intercepting drains of the French type feeding into main collector drains. A French drain consists of a gully with a porous pipe at the base covered with crushed stone or clean gravel and with a top of coarse bitumen-coated stone. The whole is some 2ft. deep.

Surface Considerations

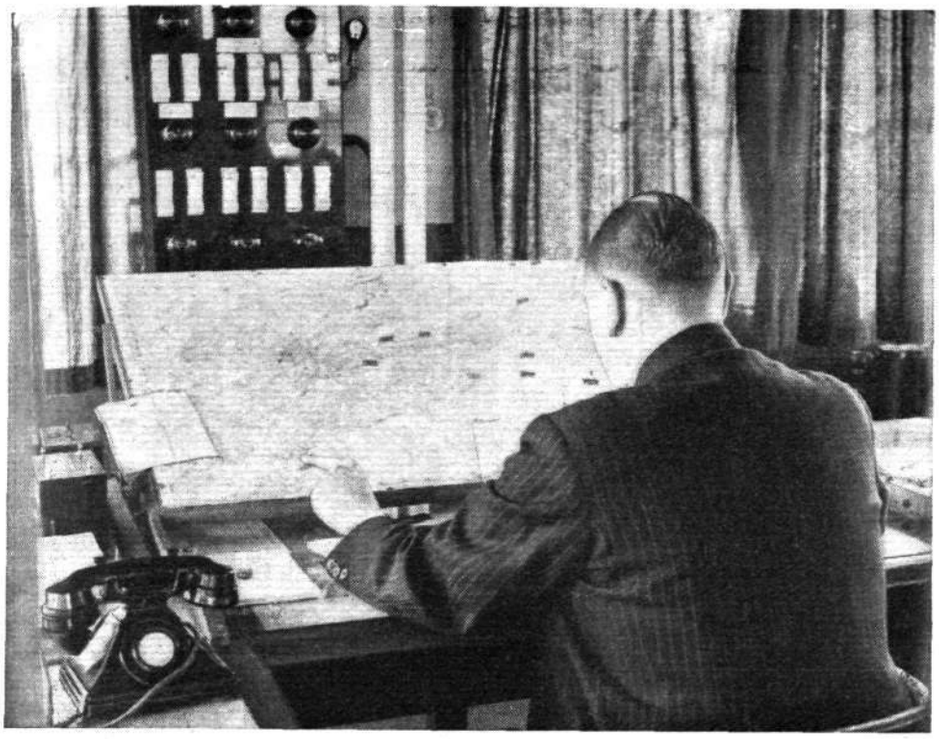
A well-maintained turf surface is sufficiently hard-wearing for normal use, but the smallest hangar or building should be provided with a concrete apron. Anyone who has seen turf outside a small apron after a day's activity in wet weather will realise the necessity. The fact that turf can stand up to the work is proved by the good appearance of many British airports, and it has the added advantage of being resilient. Eventually, if an airport attracts really heavy traffic, special surfacing towards the prevailing wind may become necessary. A heavy transport machine may exert a momentary pressure as high as three tons to the square foot. Actually, the Air Ministry has laid it down that a surface must be capable of withstanding a rolling pressure of two tons per square foot, and the recommended test is to drive a laden three-ton lorry slowly across the aerodrome. Fortunately, tail skids are rapidly being replaced by tail wheels since brakes have become a *sine qua non*.

The Need for Runways

From the single runway of special surface—which may be asphaltic concrete, allowing the runway to conform to a settling foundation without cracking, or simply turf with a bituminous binder—a complete system such as is found at all large American airports may be developed. Probably the most modern example of the system is to be found at New Orleans, where the new Shushan landplane and seaplane port has been opened. As will be seen from the plan on page 356 there are actually four separate runways, so a machine using one can never be more than 22½ degrees out of wind, and they are arranged so that the maximum "space value" is obtained and that taxi-ing rules can be made and kept. The administrative buildings and the hangars are all grouped at the base of the triangle made by the runways.

There are, however, alternative systems by which a long taxiway, extending in a semi-circle round the field, receives the brunt of the wear. At Tempelhof (Berlin) this taxiway is provided with what may be called prehensile runways, which allow heavily loaded machines to be turned into position and to get their tails up before reaching the actual turf.

Specialists who do the preliminary work on aerodromes generally use special machinery, and En-Tout-Cas (Syston), Ltd., of Leicester, have machines which can actually pull out



At present the control officer at a big airport plans the approaches and departures of machines with the aid of a map and marking flags, but in due course, no doubt, an automatic wireless-controlled system will be introduced. This *Flight* photograph was taken in the Croydon control tower and shows Mr. J. J. Jeffs at work.

a hundred yards of the toughest hedge in a day with the help of two men. The cost, therefore, which might be very heavy indeed if work was carried out simply by manual labour, is comparatively low. This company has been responsible for all the work in the cases of the Leicester Municipal Aerodrome, where two miles of hedges and hundreds of trees were uprooted; of Heston Airport, where they also erected the sundry smaller buildings; Woolsington aerodrome, Newcastle-on-Tyne, where a thousand trees were uprooted; Redhill aerodrome; and sundry R.A.F. stations. En-Tout-Cas had twenty-five years of experience in the laying out of sports grounds before taking up the work on aerodromes.

Tending the Surface

The word "Hunterise" has become a synonym for all the work involved in making an aerodrome out of a wilderness, and James Hunter, Ltd., of Chester, need no introduction. The Demolition and Construction Co., Ltd., are also workers in this field.

Agricultural implements such as mowers, drainers, ditchers and scrapers are produced especially for aerodrome work by Ransomes, Sims and Jefferies, Ltd., of Ipswich, and Dennis Bros., Ltd., of Guildford, supply their motor mower to the R.A.F. In the matter of intermediate runways made by binding the existing surface, Colas Products, Ltd., produce Terolas, which is mixed with the loosened surface before the latter is rolled and coated. Runways, incidentally, should be at least 100 feet wide, and the apron, which may be of concrete, asphalt or tarmacadam, should, in the case of larger airports, extend 300 ft. from the hangars or the terminal buildings.

The extent and size of aerodrome buildings depend on the traffic and the prospective traffic, but for obvious reasons it is essential that hangars and terminal or club buildings should be designed for expansion Even the smallest aerodrome should have some form of central building—whether clubhouse or terminal building—a hangar, a repair shop and stores.

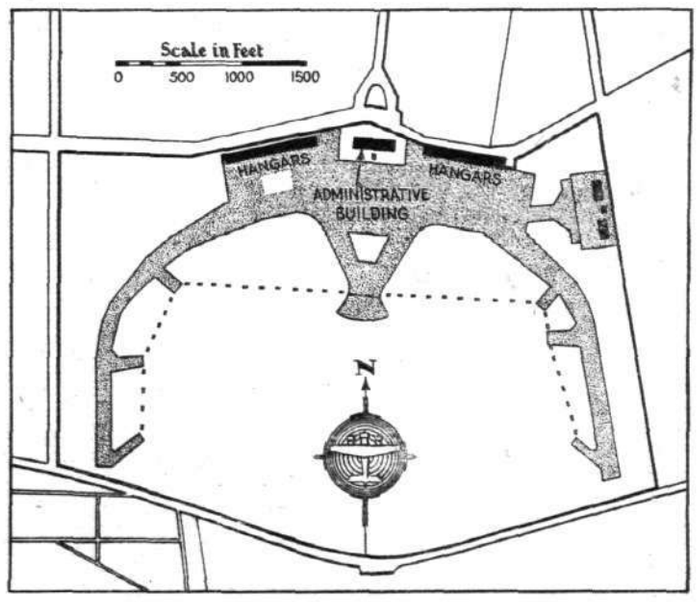
Actually, it is possible, for a start, to have one building doing the several duties. At the new Southend airport, for instance, a hangar has been erected in which part of the floor space is utilised as club rooms and in which extensions are used as flight and control offices. For the unambitious this would appear to be an ideal arrangement, for some facilities must be available for visitors by air. At the other extreme the Portsmouth Corporation intended from the start to attract both visitors by air and by road, and to construct terminal buildings which, though modest, would be ample for all contingencies.

Buildings should be kept at low as is reasonably possible, with the control tower preferably a storey higher than the rest of the terminal building and giving a good view in all essential directions. Among the intermediate airports Gravesend can be cited as an example where the buildings are sensible, grouped away out of the prevailing wind direction, and with plenty of land space available for hangar extensions. In any case, flying gaps at least 200 yards wide must be left on the boundary. By the Duval plan the buildings are arranged in a wedge-shaped sector of a circle, the centre of which is the centre of the landing area, and so that the wedge itself does not make an angle greater than 45 degrees. The administrative building forms the apex of the group, with other buildings placed behind and on either side, with a road dividing them. Shushan, previously mentioned, provides a typical example of this system.

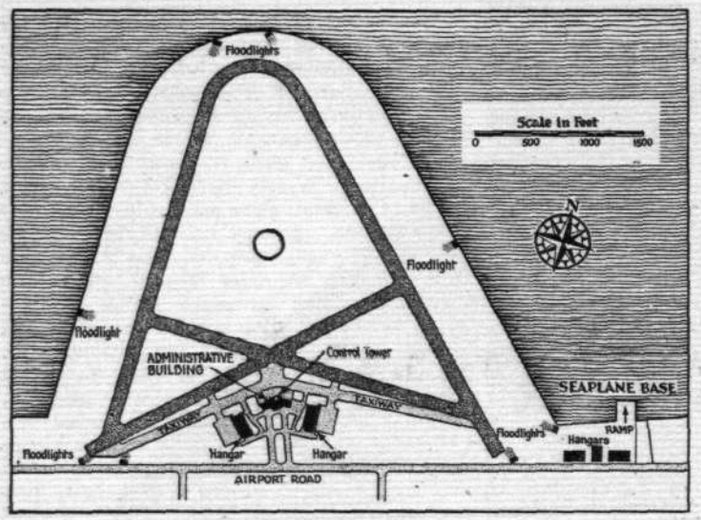
The layout of the terminal or administrative building depends entirely on the size and importance of the airport and on the idiosyncrasies of the designer. It must be kept as low as possible, the aerodrome control officer must have a view over the landing area that is as near perfect as possible, and everything should be laid out for comfort and convenience. There is considerable scope for architects and engineers in designing and planning structures which will be æsthetically pleasing, economical and efficient. After all, the foreign visitor may receive his first impression of a country from the beauty or frank utility of the aerodrome buildings. The sight-seeing public has never been successfully catered for in this country, though Croydon provides a very fair example of what can be done.

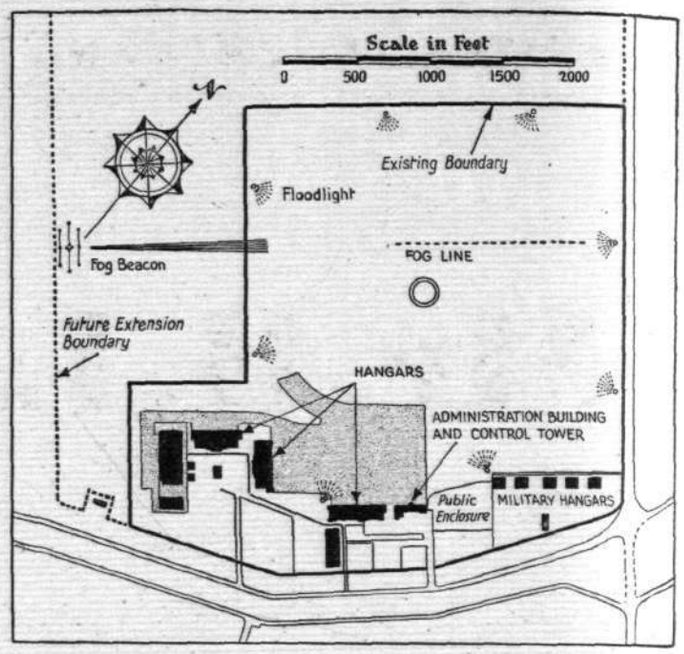
In due course, when traffic increases, it will be necessary to provide either covered or uncovered departure and arrival platforms rather after the manner of those at Tempelhof Aerodrome, Berlin. The destinations will need to be clearly indicated—if the future air traveller to the Channel Islands is not to find himself half way across the Atlantic.

For the time being the municipality need only concern itself with immediate requirements. The example of the Southend building has already been quoted, and, if a separate edifice is desired, this may be merely a temporary clubhouse—which need not be uncomfortable and which can be used as a control office; the chief instructor or the secretary may act as control officer.



Apart from the neat arrangement of the hangars and buildings, Tempelhof Airport, Berlin, has an interesting system of short runways radiating from an extensive taxying area.





The layout (above) of one of the newest American airports, that at Shushan, New Orleans, shows how buildings and a full runway system can be planned to best advantage. At Schiphol, Amsterdam, (right) the authorities have left an ample area for future extensions.

As an example of private aerodrome or club grouping, that at Mr. W. Lindsay Everard's Radcliffe aerodrome may be suggested. En-Tout-Cas constructed the hangars, offices, control tower, and the pilot's house, apart from the necessary water supply arrangements. The control officer and his department become, in an important airport, key features. Besides the work of marshalling the machines on the ground the officer is usually in complete charge of all radio communication, direction-finding equipment, and night lighting arrangements. From a mere flight office his department becomes the control room of the organisation, and the details of the wiring and so forth must be designed from the start with this probability in view.

Several airport authorities in France have of late been erecting buildings displaying interesting modern ideas in design and construction. Among these can be mentioned that at Lyons, which contains an up-to-date central depot and administration building, while the most recent of the many hangars has also been constructed along somewhat novel lines, of which more anon.

A Continental Example

Located within four miles of Lyons, the Bron airport forms a transfer point for the Paris-Lyons-Marseilles and the Lyons-Geneva lines of the Air France system. The commercial section of the airport is also the headquarters of the Aero Club du Sud Est, while several squadrons of the French Air Force are quartered in the military section. The field is marked at night by a flashing beacon mounted on the roof of the central administration building, and a second beacon is located at Mount Cendre, about six miles north-west of the airport. This is some 1,400 feet above sea level.

The airport is under the management of the City Chamber of Commerce. The administration and commercial services are arranged in the large central building, which is well equipped for handling traffic. This is a three-storey structure of cement construction throughout, and the ground floor contains a spacious hall, with ticket and baggage counters, a first-aid hospital station, and the Customs department. A weather bureau, a radio station, a library, and a restaurant are located in the two upper storeys; there is also a hotel with a number of rooms, priority in which is given to pilots and air line travellers. These two upper floors are equipped with outside balconies, and the roof of the building has seating accommodation from which a good view of the landing-field can be obtained.

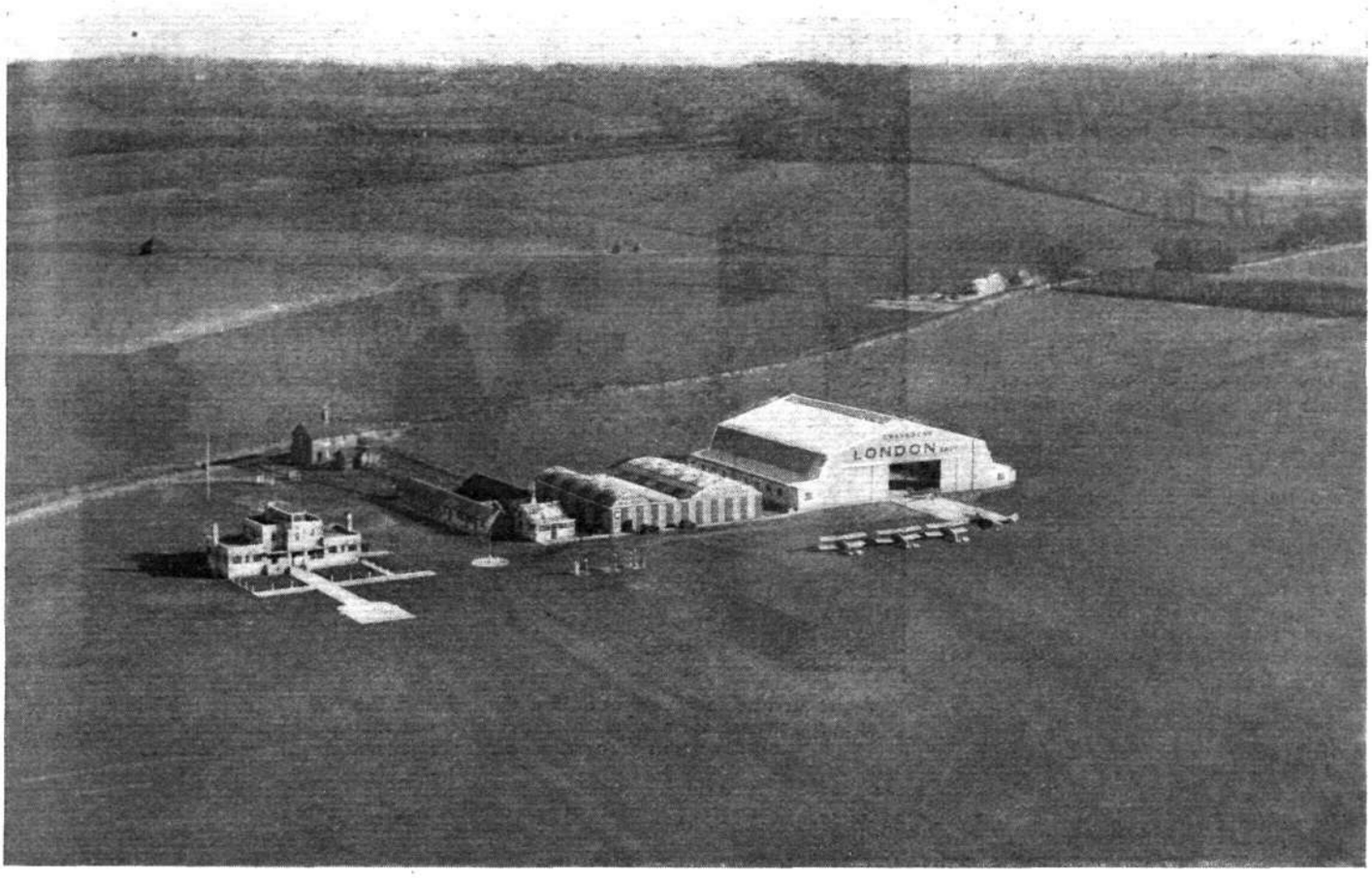
It is, of course, impossible to forecast the ultimate size of commercial aircraft, but it appears improbable that, within the next ten years at any rate, any machines larger, for instance, than the Imperial "Heracles" or the K.L.M. F.36 will be in use. In fact, the tendency to-day is towards the slightly smaller and faster type.

Nevertheless, the growing popularity of the low wing monoplane means that hangar space will be at a premium, for it is impossible with this type to arrange machines together very easily in an inadequate space. Against this may be cited the fact that the metal-skinned machine can be left out of doors without damage so long as the picketing system is sufficiently thorough. At Tempelhof, which is probably the busiest airport in Europe, the very extensive hangar is quite inadequate, but the Junkers machines are able to stay out of doors, and special picketing rings are arranged on the tarmac.

The hangar for the small aerodrome should, perhaps, be extensible, and, as the question of span is important from the constructional point of view, the best way out of the difficulty might be to use a short span, with the side, in which the opening is arranged, facing the aerodrome. The hangar could then be extended more or less indefinitely, though the entrance, of course, would be broken by roof supports.

In the early stage of airport development the departments for engine and detail maintenance, and for stores, would be simply partitioned areas of the single hangar. In a number of cases in this country a single large hangar—perhaps with 100 ft. span and a length of 250 ft.—is partitioned in this way, and steel hangars have, in some cases, been successfully heated. Maintenance work on a machine itself is, of course,

For preliminary operations a simple building, such as that erected by Boulton and Paul, Ltd., at Ryde airport, can be designed to include all the necessary features.



At Gravesend the buildings are concentrated in one place and ample space has been allowed for the erection of further hangars without encroaching on the landing area. A view from the interior of the Gravesend control room forms the heading of this article. (*Flight* photograph)

carried out in the main area where there is plenty of room.

Of the two principal forms of construction—steel and reinforced concrete—the former has the virtues of expandability and mobility, while the latter is fireproof and, once erected, costs nothing in maintenance. A concrete hangar is, however, absolutely final, but, if the plans are well and truly laid, there is no reason why this should constitute a drawback. The concrete hangar at Heston, which will accommodate some thirty light aircraft, is built in bow form, and offices and showrooms are suspended from the roof, which, in the ordinary way, is so much waste space, for the height of the doorway is the effective height of the hangar itself. In fact, roof design is the key point of hangar construction. Not only has it to support itself, but it must also be designed to carry engine repair tackle.

In the case of smaller hangars a simple truss arrangement is satisfactory, but for larger types the roof may be divided into smaller bays by lattice girders with trusses—a method which allows the use of a maximum amount of glazing in the roof itself.

Types of Hangar

Among the various systems the "Lamella" form of construction, which consists of four standard pressed-steel units—the bar itself, the top and bottom purlins, and a pair of cover plates for each point of intersection—is well adapted to hangar design. The sections are quickly assembled and rigid enough to allow erection to proceed in cantilever fashion, while any form of roof covering may be used. The units can be transported simply and the erection undertaken by unskilled labour. For larger buildings the most economical method of using this form of construction, which is manufactured under licence by the Horseley Bridge and Thomas Piggott, Ltd., of Tipton, is in the form of an arch springing from foundations immediately above ground level, in which form spans of 250 ft. are practicable. Incidentally, a rail for crane work can be mounted centrally along the ridge. The structure is capable of being extended or moved, and an example can be seen at Heston airport.

Probably the best-known constructors of steel hangars are Boulton and Paul, Ltd., one of whose buildings—probably having the largest clear span in the country—is also to be seen at Heston. The fact that such hangars are easily portable is proved by the way in which a number, originally erected at Maylands for Hillman's Airways, were removed and re-erected at Essex Airport, Stapleford Abbotts.

"Monolithic" hangars are more popular on the Continent and in America. One of the interesting models shown in the Air Ministry exhibit at the Paris Show was that of the new hangar which has recently been completed by the Dumez Construction Company, of Paris, for the French Naval Air Base situated at the Etang de Berre, near Marseilles. Of cement construction throughout, this building presents large unencumbered floor surfaces. It provides approximately 183,000 sq. ft. of floor surface. Two transverse fire walls, situated 227ft. apart, divide this floor space into three practically equal separate sections.

Two French Designs

Three large beams, each 16ft. 3in. in depth, 11ft. 4in. in width, and 682ft. 6in. in length, extend across the full width of the hangar. They are hollow, with walls 8in. thick, and are supported by columns placed 227ft. apart and located in the fire walls. One of these beams forms part of the front structure of the building, and constitutes the upper part of the doorway of each of the sections of the hangar.

At present a winch, capable of raising 20 tons, is mounted inside each of the two large beams which span the repair section, which is also equipped with four travelling 4-ton cranes which, mounted on transverse beams, cover the entire depth of the hangar. The roof of the building, incidentally, is supported on trussed arches resting on these beams.

Each of the sections is equipped with a sliding door of the full width of its frontal area. These doors are made of corrugated galvanised steel plates reinforced by steel stiffeners placed at short intervals apart. The doors are mounted on ball-bearing rollers, and are quickly run inside the hangar, alongside the fire wall partitions, by means of an electric motor.

The most recently constructed of the hangars at Bron Airport, Lyons, presents some interesting features. The roof of the building is supported by a large single beam which is mounted on a column located in the centre of the floor and extends across the entire width of the hangar. An unencumbered floor surface is thus presented at both ends of the

building. Each of these ends is equipped with large sliding doors extending across their entire width.

Just as the effective height of a hangar is determined by the doorway, so, to a smaller degree, is the effective width determined by the door opening. Usually the "door" consists of a series of steel frames, about 25ft. in width, mounted on wheels which run on tracks flush with the floor and with guided rollers at the top. The tracks run beyond the opening on either side so that the frames can be arranged one behind the other. There are several patented doors, such as the rolling shutter or canopy types. An example of the former is the Kinnear, manufactured by A. L. Gibson and Co., Ltd., of Twickenham. In any case the doors should be capable of being opened and closed by one or two men unless some form of power operation is provided.

The floor of a hangar is usually of concrete, with a fall either to the centre or towards the apron, where a grating can dispose of water. The best form of lighting is provided by a form of floodlight arranged in each corner or on the walls. Steel buildings are difficult to heat, but some attempt should be made, as the work on aircraft and aircraft engines is usually of a delicate kind. The concrete or solid-walled hangar has a distinct advantage from this point of view.

While air-line development is in a state of flux, the Air Ministry is helping to equip airports, where necessary, with portable radio and direction-finding sets. This illustration is of the interior of the Marconi mobile unit.

In connection with the protective and decorative painting of hangars and airport buildings in general, there are several types of finish. The synthetic gum in Cerrux, a product of Cellon, Ltd., of Kingston-on-Thames, makes this finish very tenacious, and it has been employed at a number of well-known airports and aerodromes. It is produced in a number of flat and satin colours, and can be applied by either brush or spray.

Titanine-Emaillite, Ltd., of Hendon, have, too, a synthetic protective lacquer known as Lumilac. This finish can also be applied in any way and dries very quickly in comparison with ordinary paints and varnishes. John Hall and Sons, Ltd., of Bristol, have a special protective paint known as Brolac, which is available in white, aluminium, yellow, black, and thirty-six colours. For interior work Brolistic lacquer-bound water paint can also be used.

Fuel Supplies

For roofing Cellactite, which is an asbestos-protected metal produced by Cellactite and British Uralite, Ltd., is probably the best-known material. The firm also produces special ventilators for hangars and other aerodrome buildings.

There are a thousand and one details of hangar and workshop equipment which can hardly be covered in an article such as this, but the least ambitious project requires equipment for the storage and handling of fuel and oil. The days when mechanics carried petrol or oil cans across the tarmac to a waiting machine are definitely over, and pilots expect both liquids to be pumped into their machines in the quickest and cleanest manner.

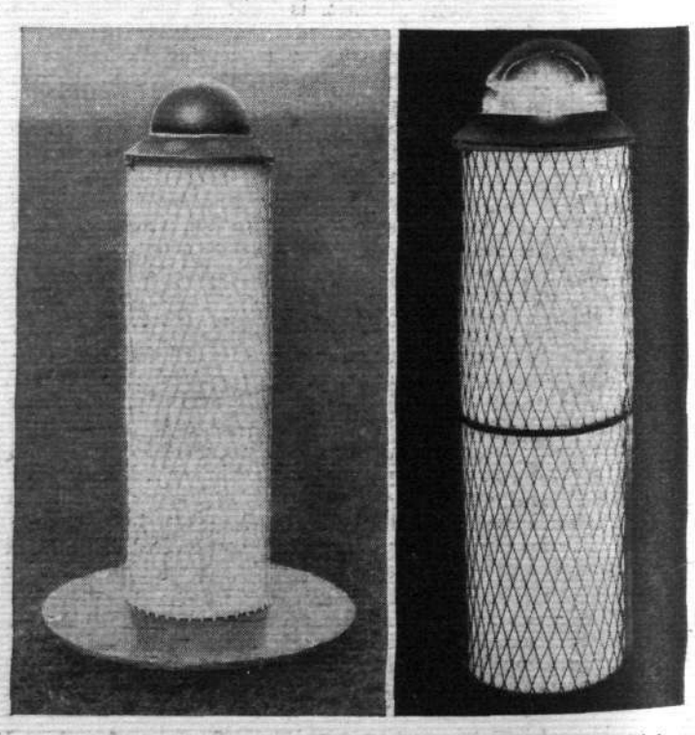
Dealing first with oil supply, the Vacuum Oil Company has a drum trolley in which the lubricant is pumped from the replaceable container to the tank while a metering device registers the quantity delivered. A quart is delivered for each working stroke through fifteen feet of fabric hose with a shut-off nozzle. Silvertown Lubricants, Ltd., have also supplied a portable oil carrier to a number of aerodromes.

The petrol supply equipment of aerodromes is continually undergoing revision. Though in many cases the garage pump is the basis, the mobile unit gives greater flexibility. For immobile units the tendency to-day is to arrange the fuel and oil supply base as a separate island surrounded by tarmac, though the increased popularity of the low-wing monoplane may foster the design of the pit system.

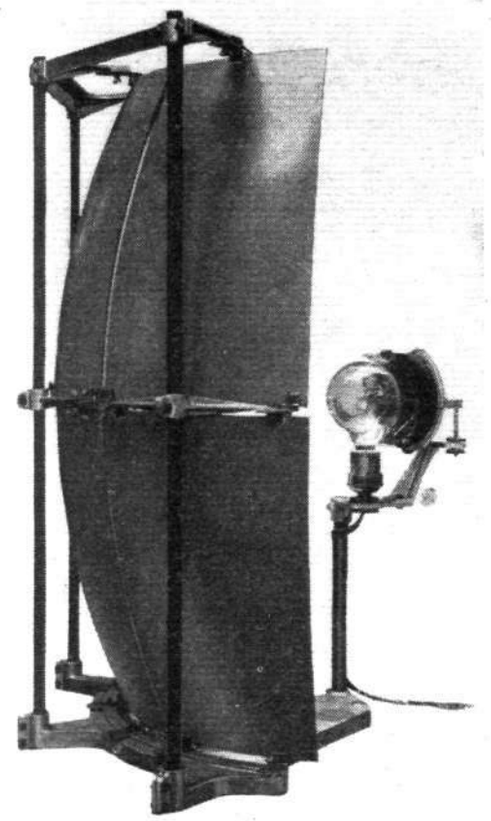
By means of long, swinging arms and hose a number of machines can be refuelled at once. Good examples of this system can be seen at Heston airport and at Hatfield. The pumps at the latter aerodrome were installed by the Wayne Tank and Pump Co., Ltd., of Newlands Park, London, S.E.26, who have also supplied some seven aerodromes with electrically operated meter pumps. A specially interesting unit, installed about two years ago, is the Busco meter unit in the main Imperial Airways pit at Croydon. This meter has passed something more than 900,000 gallons of petrol without trouble. Now that most aerodromes have electric power laid on the hand-operated pump is going out of use. At Hatfield, incidentally, there is also a Wayne oil fountain.

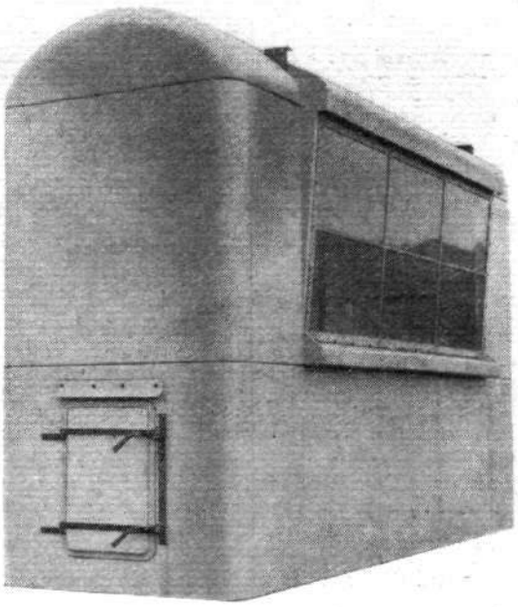
The mobile type of equipment, which has been introduced during the last two years after much pioneering work by Shell-Mex and B.P., Ltd., consists of a tank, from which delivery is made by an engine-driven pump through a delivery meter—in the case of Shell equipment these are, respectively, of Zwicky and Kent manufacture—mounted on a normal lorry chassis with special fire-proofing and fighting equipment.

The National Benzole Company have also developed six-



A typical example of the latest type of boundary light which gives the pilot an idea of perspective. This particular design is produced by Chance Brothers.





The Chance floodlight unit and its Laminoid housing, which allows an operator to work under cover.

weighs less than three pounds.

On larger airports it will eventually be necessary to provide special trolleys for moving larger machines from place to place. At Croydon, of course, small tractors are used, but at Tempelhof, for instance, motor-driven tail trolleys are favoured. Shelvoke and Drewry, Ltd., of Letchworth, produce two types of trolley, one for handling six-ton machines on tarmac or on hard ground, and the other for handling eight-ton machines on rough grassland. In general each machine consists of a long triangular frame, the base of the triangle being mounted on a driving axle, while the apex is supported on a castor wheel and carries the controls. The lifting hook is operated by two hydraulic rams, pressure being supplied from an engine-driven pump. Ransome, Sims and Jefferies, Ltd., also produce a similar device.

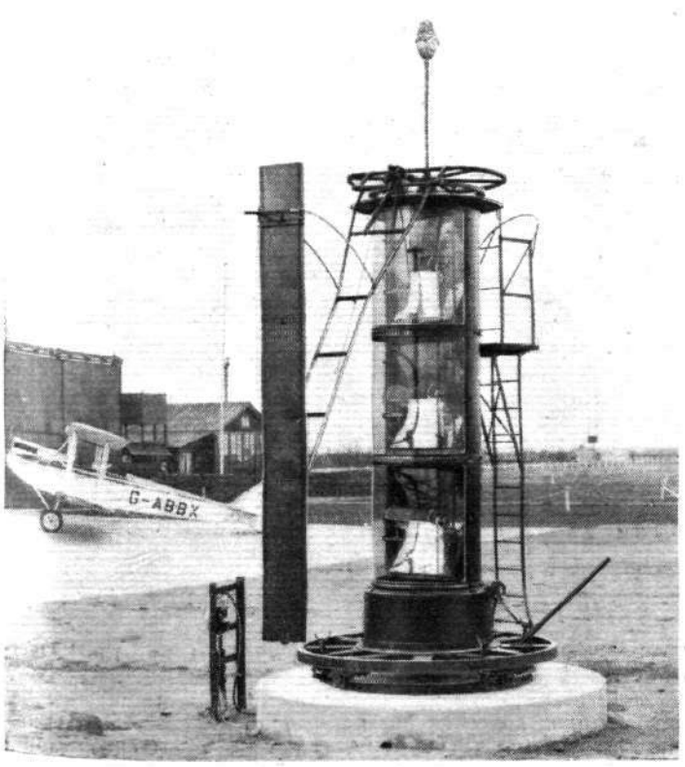
For all normal aerodrome purposes the windsock has probably come to stay. It is extremely accurate, giving momentary changes, and the reasonably experienced pilot can gauge the speed of the wind by a glance at its angle. Nevertheless, every important airport should have a smoke indicator, a wind tee—which is capable of being lighted for night work—or something on the lines of the Zeppelin-shaped indicator, designed by the Martin-Baker Aircraft Co., Ltd., of Higher Denham, which is in use at Heston airport.

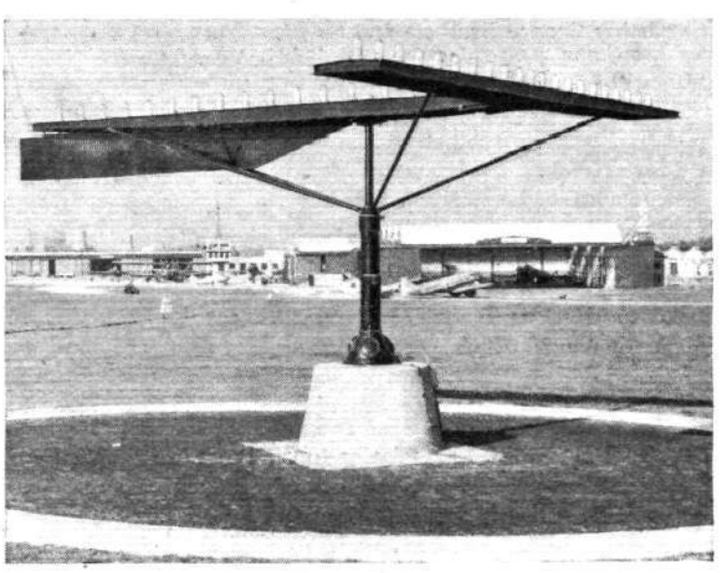
Both the larger types of indicator and the smoke indicator can be seen properly by the pilot, as he makes his circuit at operating height, in all but conditions of really hopeless visibility. He can then make his approach in a general direction and obtain a final confirmation from the indicator as he crosses the boundary. Incidentally, the Martin-Baker company are producing an improved version of their indicator.

Apart from wireless equipment, which is entirely a matter for the specialist and is handled by the Air Ministry (an article on modern aircraft radio and ground control appeared in *Flight* of March 14), aerodrome lighting is unquestionably the most interesting subject connected with airport development. There is little doubt that within five years, and with the assistance of full radio facilities, including blind-landing equipment, night flying will be considered to be almost as normal as day flying. After all, only by night schedules can our internal air lines compete with a very excellent system of rail and road services.

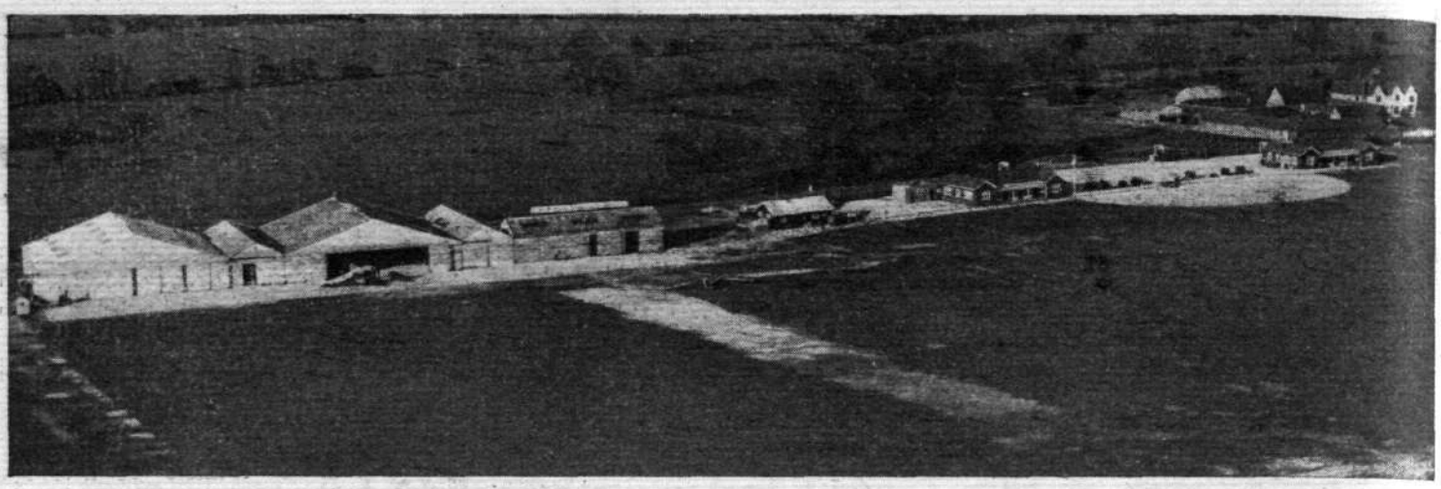
wheeled mobile tankers, with a capacity of 800 gallons, from which the fuel can be raised 35 feet.

Thompson Bros. (Bilston), Ltd., have specialised in fuel supply equipment for the past ten years. With their mobile equipment fuel can be delivered to a height of 25 feet at a rate of 70 gallons a minute. The company also produces several hand-operated portable units giving from six to twenty gallons. Kent meters and Zwicky pumps are used in T.B. equipment. Zwicky, Ltd., of Slough, incidentally, produce a wide range of units, including a mobile type which is capable of refuelling three machines together at the rate of 100 gallons a minute, and a small hand pump which, by itself,





For smaller airports the static shadow-bar type of floodlight equipment, such as that shown on the left and made by the General Electric Company, is quite satisfactory. On the right is an example of an illuminated wind indicator—actually the G.E.C. equipment at Croydon airport.



Where it is desired that the landing area should not be restricted buildings must necessarily be arranged in "single file" along the perimeter of the aerodrome. This *Flight* photograph of Essex airport shows also the extensive car area provided—visitors are definitely encouraged.

It is comforting for the small operator and the small municipality to know that full electric equipment is not entirely necessary, and certainly not for a start, when few machines can be expected to be flying after sunset. A series of red boundary and obstruction hurricane lamps and a flare path, which can be put out on request either directly by wireless or by telephone from a terminal airport, will be ample for emergency purposes. Many pilots, in fact, prefer flares to floodlights, though this is largely a matter of habit and the result of the fact that many air-line pilots have been in the R.A.F. It has been proved at Gravesend, which is being used this year for alternative night landings by both K.L.M. and D.L.H., that practice will enable the whole equipment to be put out in a very short time. Improved flares, such as the Gooding, can be wheeled in a trolley on to the aerodrome, and each can be lit from one. The pilot treats the flares as guides rather than as actual lights, and judges his height and position from the shape of the path.

Nevertheless, when an airport is being used by a night-operating air line, a full electrical system, switched on and off from the control tower, will be absolutely necessary. A terminal airport requires: (a) an identifying beacon of the flashing or rotating type; (b) boundary lights; (c) obstruction lights; (d) a ceiling projector; and (e) floodlights. If runways are used these will need to be marked, and an illuminated wind tee—preferably one which will return to a predetermined position in winds of less than, say, five miles an hour—will, of course, be a detail necessity. Last year a British Standard Specification for Aerodrome and Airway Lighting was published with the approval of the Air Ministry. The specification is the result of four years of international meetings, and the colour and other requirements are fully set out therein.

Lighting Equipment

Probably Chance Brothers and Co., Ltd., of Smethwick, are the best-known manufacturers of lighting equipment. They turned to aerodrome and airway lighting quite naturally after some eighty years of experience in marine work, and are in a position to supply floodlights, beacons, wind indicators and obstruction lights, or submit complete schemes. Their latest type of boundary light is of the pillar form, which gives the pilot an idea of his position and height. Incidentally, lights of this type have been supplied by the Cardiff Foundry and Engineering Co. to Hillman's Airways, and these were described in *Flight* of March 21.

Chance Brothers have also developed a new type of floodlight housing which is made of Laminoid and which enables the attendant to work under cover. The floodlight system itself consists of three units mounted side by side and giving a candle-power of 1,250,000 when corrected for atmospheric absorption. A Chance-Airwork shadow-bar floodlight has been in use at Heston for some time.

Floodlight Types

Another company specialising in the lighting of airports is the General Electric Company, Ltd., who have recently secured a contract for the installation of eight 6/kw. floodlights at Croydon aerodrome, and these will be in operation in a month. A fortnight ago the company also installed a shadow-bar floodlight at Cardiff airport. The normal type contains nine thousand-watt horizontal lights with three tiers of parabolic reflectors, and may either be mounted on a mobile unit or be arranged in fixed series around the boundary, one or another being switched on according to the direction of the wind by the control officer.

In the case of the normal floodlight, of course, the pilot lands his machine down the beam, but a single fixed rotatable floodlight can be used so long as a shadow-bar is fitted for occasions when the pilot has to land more or less towards the beam. This system is useful in the case of small aerodromes where the first costs must be kept down to a minimum, but the shadow-bar operator has an equal responsibility with the pilot and must, of course, be with the equipment when an aeroplane is due to land.

The General Electric Company produce neon beacons and lighted wind indicators in addition to floodlight equipment, and also a new type of pillar boundary light in which light is cast on to the base. Incidentally, B. Dixon-Bate, of Chester, has introduced a self-contained beacon with a heavy spherical base which causes it to assume a vertical position after being placed on its side. Apart from the "Kelly" effect, this beacon obviates the necessity for laying cables, which is an expensive business. A 70 amp/hr. battery allows the beacon, which is, of course, applicable to other uses, to operate for 200 hours.

During the past two years there has been a greatly increased interest in aerodrome lighting, and the firms concerned can carry out equipment work of any kind.

In conclusion it should be mentioned that the Airports Section of the Society of British Aircraft Constructors, at 1, Albemarle Street, London, W.1, and the Aerodromes Advisory Board, at 5, Verulam Buildings, Gray's Inn Road, London, W.C.1, which established a site selection committee in December last year, are always willing to assist prospective airport operators and to put them into touch with specialists in any particular branch of the work.

Britain's New "Medium" Bomber

PERFORMANCE figures relating to the Boulton Paul "Overstrand" "medium" bomber ordered for the equipment of No. 101 (B) Squadron have recently been made known. On the power of two Bristol "Pegasus M" (moderately supercharged) radials the machine has a maximum speed of 152 m.p.h. at 5,000 ft. At 20,000 ft (which is 2,500 ft. below the machine's service ceiling) the speed is 135 m.p.h. The rate of climb, as expected, is exceptionally good, ranging, as it does, up to 1,140 ft./min. at 5,000 ft. Both take-off and landing runs are very short, and the "Overstrand" stalls at 54 m.p.h.

These qualities should enable the machine to be operated from confined spaces. It is extremely manœuvrable (those who saw the combat between the prototype "Overstrand" and a flight of "Bulldogs" at the last R.A.F. display will confirm this) and the bomb load, it is understood, is vastly heavier than that of the "Sidestrand." Service pilots await the machine with interest.

A NEW POBJOY ENGINE

The "Niagara II" : Many Detail Improvements and Direct Electric Starting

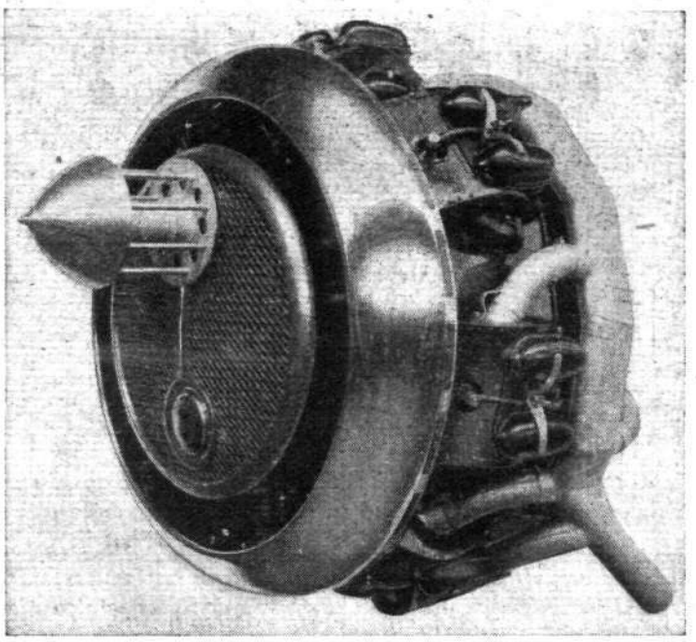
POBJOY aero engines are well known as being among the lightest and most efficient radial air-cooled units on the market. The new model, the "Niagara II," is basically the same as the Niagara I, two of which were in the Monospar S.T.10 which won the King's Cup Race last year, and which was described in *Flight* of February 1, 1934. The latest version, however, incorporates several interesting features, including direct electric starting, drive for an electric generator, positive oil feed to the exhaust rockers of all cylinders, a redesigned rear cover and induction cover, and redesigned cylinder heads, giving better cooling by an increase in fin area.

Rotax are responsible for the whole of the electrical equipment—the starter, generator and magnetos, the latter being of the four-pole type, running at half engine speed.

The new induction cover is a particularly interesting Elektron casting, so designed that the mixture from the carburetter is led upwards and backwards through the centre of the cover to a common chamber encircling a hot-spot to which heat is supplied by the exhaust gases. From this chamber separate passages conduct the mixture to each cylinder. The excellent distribution achieved by this method is claimed to result not only in increased efficiency, but also in exceptionally easy starting.

Two further points of interest are drives arranged one on each side of the rear cover, and available for two engine-driven fuel pumps, or, as in this first engine, for one Tecalemit fuel pump and one sealed indicator which records the number of hours the engine has run. These hours, incidentally, are calculated at a running speed of 3,100 r.p.m., so that a pilot who habitually flies at more than this specified cruising speed actually gets a smaller number of hours out of his machine than recorded on the counter; in view, however, of the extra wear entailed by the higher speed, this is an equitable arrangement, as the maker's guarantee, which extends for 250 hours running, is taken from the reading of the counter.

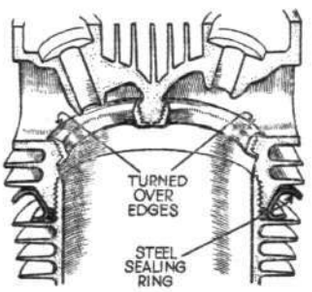
The Rotax starter motor weighs 9lb. complete, and the dog engages direct on the rear end of the crankshaft. The motor is geared 60:1, and is sufficiently powerful to turn the engine over at 110 r.p.m. when cold; starting is therefore an easy matter.



This view of the "Niagara II" with its cowling shows the clean external appearance.

The Rotax generator is mounted vertically beneath the engine, in front of the Claudel-Hobson carburetter, and is driven from a shaft which at its upper end serves to drive both magnetos. Between the shaft and the generator itself is a very neat shock-absorbing unit. The generator is sufficiently large to keep an aircraft battery charged over and above the requirements for night-flying equipment, radio, and engine starting.

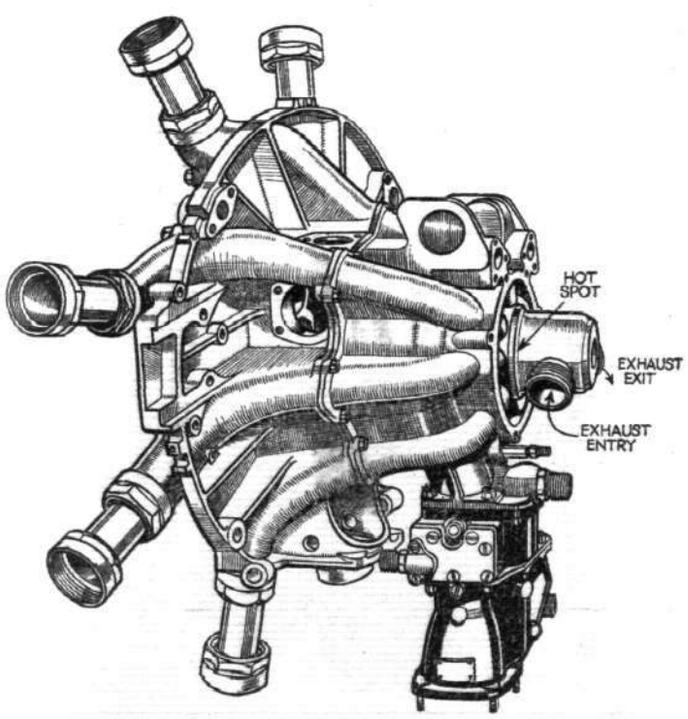
The aluminium cylinder heads now have deeper and larger fins, and, of course, carry the patented Pobjoy type of manganese-chrome steel valve seats, which are screwed and shrunk into the head, and are so designed that a lip on the upper side can be peaned over, thereby entirely eliminating any possibility of the seats working loose and falling into the cylinders.



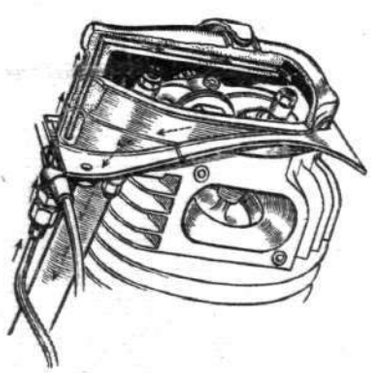
Section of a cylinder head, showing the steel seating ring and the valve seats.

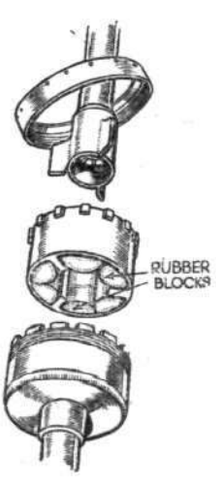
The mounting of the brackets carrying the valve rockers is another interesting Pobjoy feature; the arrangement prevents alteration of the valve clearances due to unequal expansion between the steel cylinders and the aluminium heads; the brackets are virtually bolted direct to the steel cylinder barrel, in such a manner that the head can expand irrespective of the bolts.

The high-pressure oil feed, which is now led to each exhaust

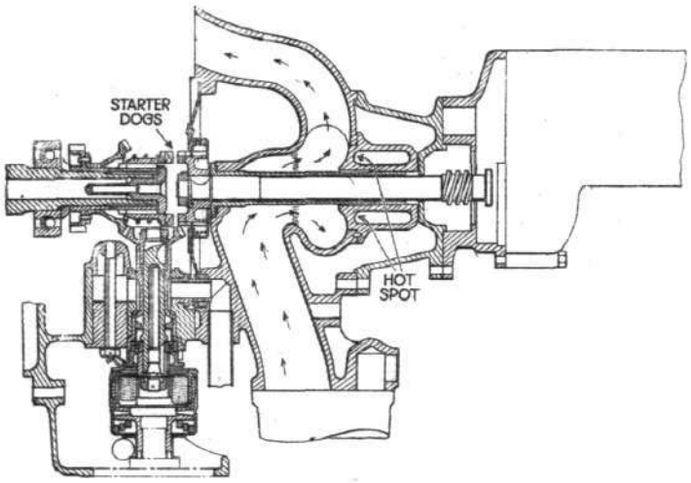


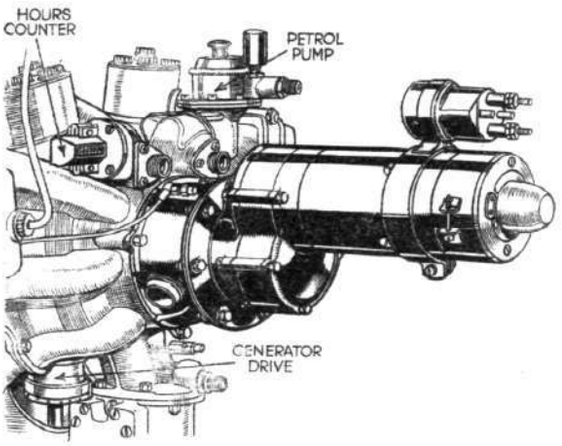
The rear cover and induction cover ensure even distribution of the heated mixture from the carburetter.





(Above) All exhaust rocker boxes now have direct high-pressure lubrication. (Right) Assembly of the shock-absorbing drive to the generator.





The sectional drawing on the left shows the starter and generator drives of the "Niagara II" and the distribution of the mixture from the carburetter. On the right are the direct electric starter, the petrol pump, and the hours recording counter.

rocker box, is taken from the main supply of the engine, and has proved so adequate that any other form of lubrication is entirely unnecessary, thus obviating the need for attention to the valve gear under 125 hours.

Complete cowling as regards the front ring and between-cylinder baffles is supplied as an integral part of the engine, and its efficiency may be gauged from the fact that there is now practically no variation between the temperatures of each cylinder. A sheet-aluminium guard is provided surrounding the rear of the engine, and shielding it from the exhaust pipes so that in the event of a crash the exhaust pipes are trapped between two sheets of cold aluminium; fire risk is thus minimised considerably.

ABRIDGED DESCRIPTION.

Crankcase.—Light alloy, in four parts, carrying patented single-throw, two-piece crankshaft on four bearings. Front bearing plain, two large roller bearings either side of the crank-throw, and a rear ball bearing.

Master Rod Assembly.—A single crankpin carries a floating bronze bush running inside the hardened eye of the nickel chrome steel master rod, to which are linked six articulated connecting rods.

Cylinders and Pistons.—Cast-aluminium cylinder heads screwed to steel cylinder barrels and locked by a steel ring.

Valve Gear.—One inlet and one exhaust valve in each cylinder head, actuated by ball-bearing rockers and push rods, which work in aluminium cases secured to the valve tappet chamber by rubber-lined expansion joints. Both exhaust and inlet valve mechanism enclosed in separate oil-tight easily detachable aluminium casings.

Reduction Gear and Centrifuger.—Double helical reduction gear with an efficient shock absorber. A hollow filter-flywheel is secured to the crankshaft and serves to steady the drive and filter the lubricating oil.

Ignition.—Two complete independent ignition systems, each with a Rotax four-pole polar-inductor magneto feeding the K.L.G. V.12/1 sparking plugs through a separate H.T. distributor.

Carburetter.—Claudel-Hobson A.V. 400 carburetter, hot-oil-jacketed to prevent freezing.

Priming Pump.—An adapter is fitted to the induction manifold so that a priming pump can be used.

Starting Gear.—Electric or by hand lever, operated from cabin.

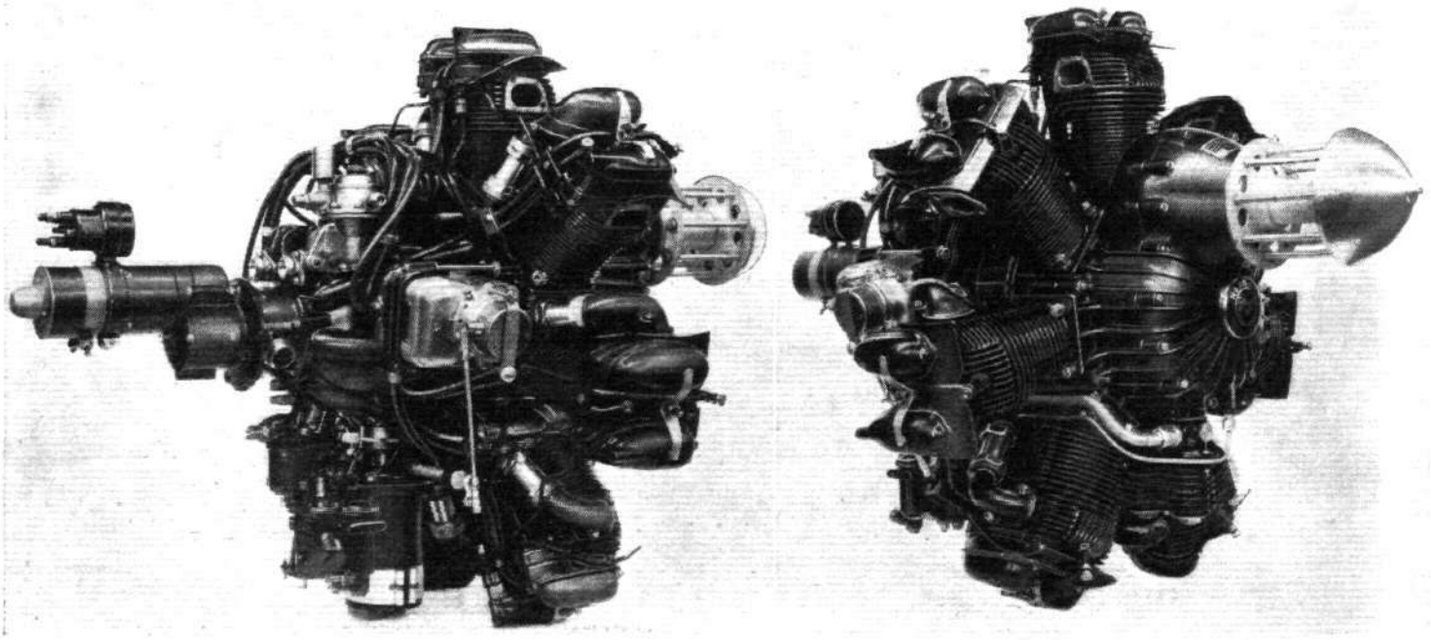
POBJOY "NIAGARA II"

TYPE: Seven-cylinder radial, air-cooled, geared, dry sump.
ROTATION: Left-hand (airscrew); right-hand (crankshaft).
BORE: 77 mm.
STROKE: 87 mm.
SWEPT VOLUME: 2,835 c.c. (173 cu. in.)
POWER AND RATED R.P.M.: 84 b.h.p. (actual) at 3,200 r.p.m (1,500 airscrew r.p.m.).
MAXIMUM POWER AND MAXIMUM R.P.M.: 90 b.h.p. at 3,500 r.p.m.
GEAR REDUCTION: 0.468 : 1.
OVERALL DIAMETER: 26.5 inches (673 mm.).

WEIGHTS:

	Lb.	*Kg.*
International net dry weight (including complete ignition system [unbonded] carburetter and induction system, oil outlet pipes, magneto and throttle control rods and shaft, hand starting gear, hours counter; but excluding exhaust system, cowling, airscrew hub, air intake and fuel pump)	153.0	*68,0*
Standard exhaust system	6.5	*2,95*
Cowling	10.0	*4.5*
AC/B fuel pumps each	2.5	*1.1*
Airscrew hub	3.5	*1.6*
Air intake, plain pattern	0.5	*0,24*

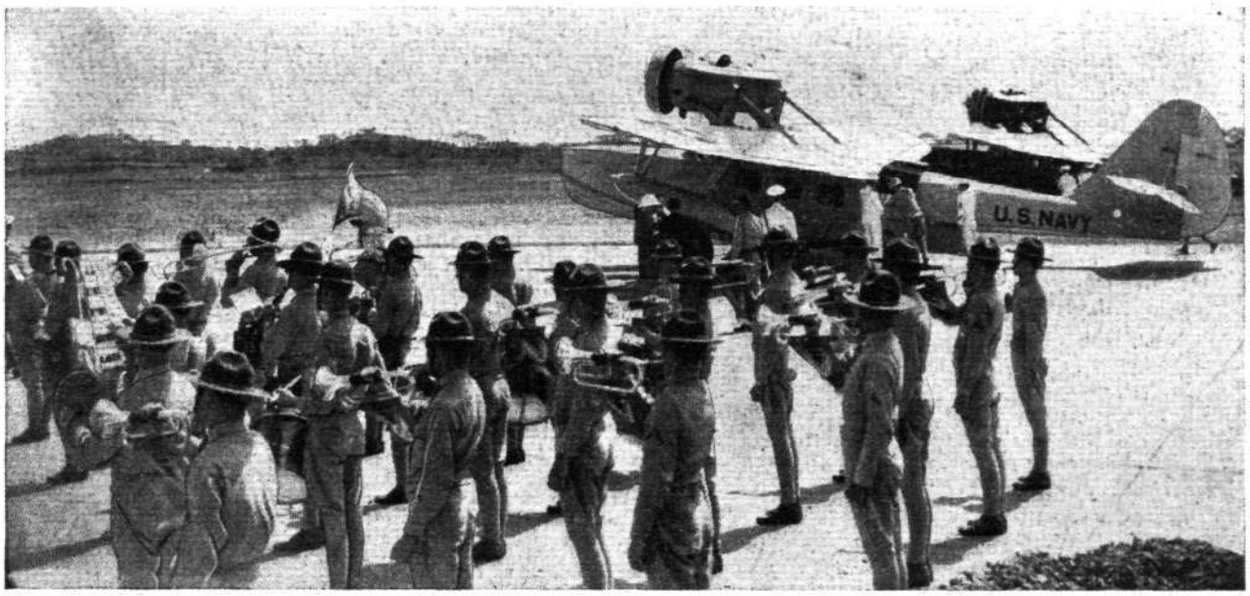
FUEL CONSUMPTION: At 95 per cent. throttle and less: 0.53 pints (*0.30 litres*)/b.h.p. hour. At full throttle: 0.62 pints (*0.35 litres*)/b.h.p. hour.
OIL CONSUMPTION: 1.0 pints (*0.57 litres*) per hour.
OIL PRESSURE: 40 to 50 lb./sq. inch (35 lb. minimum).
OIL TEMPERATURE: Inlet, 45° C. to 65° C.
OIL IN CIRCULATION: 6 pints (*3.4 litres*) minimum.
VALVE TIMING (at hot clearance of 0.012in.): Inlet opens 7° early; exhaust opens 62° early; inlet closes 56° late; exhaust closes 13° late.
VALVE CLEARANCES (cold): Inlet, 0.002 in.; exhaust, 0.002 in.



Two views, with the cowling removed, which indicate the general arrangement of the components on the latest Pobjoy engine.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS



SALUTE : The Duke of Gloucester, who is now home in England, made several flights during his world tour. At Balboa, Canal Zone, he broke his homeward journey in order to make a long flight over the Isthmus of Panama in a U.S. Navy Douglas "Dolphin." A detachment of the 33rd United States Infantry is here shown giving the Duke a musical send-off on that occasion.

Honour to Sir Macpherson

Next Thursday, April 11, the committees of the Royal Aero Club, the Royal Aeronautical Society, the Air League, and the S.B.A.C. will give a luncheon at Grosvenor House, London, to Sir Macpherson Robertson and Lady Robertson, who are now in England.

One More "Signpost"

A large directional sign giving the bearings of Heston has been placed on the roof of the Hoover factory at Perivale, Ealing.

On Safari

The Vanderbilt safari has hired one of East African Airways Waco four-seaters, with Mr. C. W. F. Wood as pilot. A base will be established in the Serengetti.

For Valour at 440 m.p.h.

During celebrations of the twelfth anniversary of Italy's Air Force, Pilot Officer Agello, holder of the world's speed record, was decorated with the Gold Medal for Valour by Signor Mussolini.

An Aerial Seance

A party of spiritualists sat in silence (!) in the darkened cabin of an aeroplane 4,000 ft. above New York last week, and claimed to have heard the voices of Amundsen, Wilbur Wright and Sir Arthur Conan Doyle.

"Aquaerial" Transport

On alighting from a Jersey Airways "Dragon" at Heston, a passenger was seen to steer an unerring course at high speed to the nearest tap, where he replenished a glass tank containing goldfish, which he had brought over from Jersey.

Stratospheric Frigidity

A temperature of -76 deg. F. was recorded at a height of 33,790 ft.—the "borderline" of the stratosphere—by instruments in a balloon released by the Moscow Hydrological Observatory. At 129,855 ft., the greatest height recorded, the temperature was -51 deg. F.

"Blind Flying" for Italy?

General Valle, the Italian Under-Secretary for Aviation, after telling the Chamber that "the storm clouds on the horizon" were "too black for delay" in the matter of building a strong Italian air force, said that about £17,200,000 would be spent on military aircraft during the period 1936-1937.

Flying Hours—a Comparison

Reports from Italy state that the Royal Italian Air Force in 1934 flew 185,176 hours, covering more than 20,000,000 miles at an average speed of about 109 m.p.h. The British Royal Air Force is at present smaller than that of Italy, but in 1934 our machines flew more than twice as many hours and covered more than double the distance.

Twenty-five Years Ago

From "Flight" of April 2, 1910.

"Leading particulars of the Handley Page monoplane exhibited at Olympia: Span, 32ft. 6in.; length, 20ft.; chord, 6ft.; total flying weight, 450lb.; loading (all weight supported on main planes), 3lb. per sq. ft.; engine: 20-25 h.p. Advance; speed of flight, 35 m.p.h.; system of control: elevator and rudder (warping optional); price, £375.

Wedding, 1935

Guests at the London wedding of Lady Norah Jellicoe to Mr. Edward Rhys Wingfield on Saturday arrived by air from the Isle of Wight and returned in a similar manner. Mr. Lionel Balfour, Lord Jellicoe's son-in-law, is a director of Portsmouth, Southsea and Isle of Wight Aviation, Ltd.

A Portuguese Aero Show

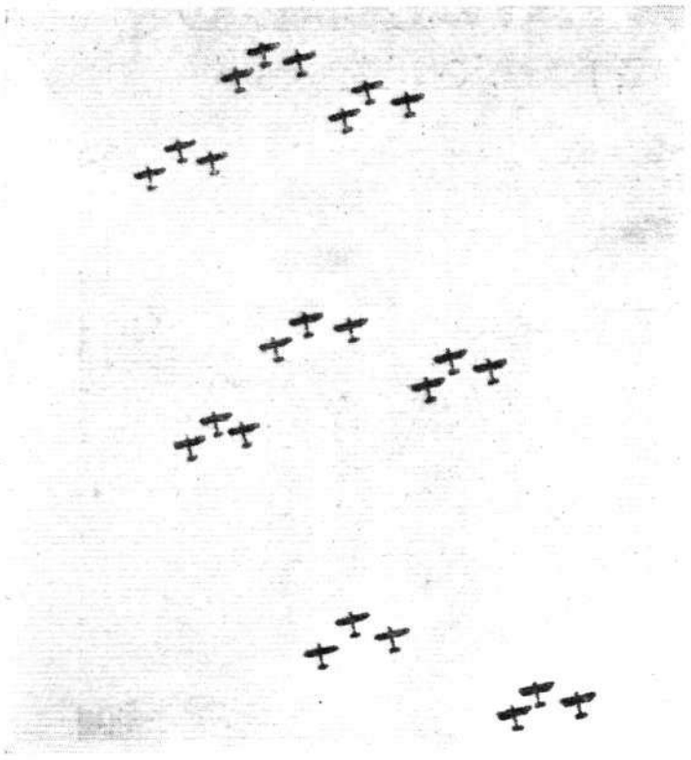
For the first time in its history Portugal is to have an international aero show. Organised by the Aero Club of Portugal, under the patronage of the National Air Council, the exhibition will be held in the Exhibition Palace of Lisbon from June 1 to June 15. It is to be hoped that British aviation will be well represented. Arrangements have been made for the cancellation of all duties and dues on foreign exhibits entering Portugal for the exhibition. Application for stand space at ordinary fees should be made before April 10.

Those Pacific Airports

It would seem that between them Japan and the United States will create quite a "corner" in Pacific airports in the immediate future. We have already referred to the airports, stations, or bases established, in the first place by Japan on certain mandated islands, and secondly to Pan-American Airways' America-China service stations. Recently it was reported that Japanese interests were negotiating a loan in the Macao (the Portuguese dependency near Hong Kong) waterworks, and, it is suggested, intended developing the property as an aerodrome. Again, a little while back it was reported that Japan was making efforts to establish an air base at Bangkok, Siam!

GERMANY LIFTS the VEIL

Military Machines Make Their First Public Appearance



NOW that Germany has come out into the open and allowed photographers to be present during Air Force manœuvres, it is possible to examine somewhat more closely the type of aircraft being used.

The first point of interest is the civil registration letters, which look both incongruous and unnecessary. The machines themselves appear to be Heinkels, although that is not certain, and it is somewhat surprising, in view of the fact that German civil aircraft are so advanced in design, that these military machines do not look particularly efficient nor of very modern design. It is possible, of course, that those shown are merely a "blind" to hide more efficient types which the authorities do not yet wish to disclose; we know of people who many months ago watched the early morning training of this embryo air force, and that they were very impressed indeed both with the performance of the machines and with the quality of the flying. As can be seen from the photographs, the formation flying is excellent.

The Heinkel aircraft factory is rumoured to be turning out fourteen finished aircraft a day!

(Above) Machines of the German Air Force flying in obviously well-practised formation during last week's review by Herr Hitler.

(Right) Fighters lined up during the manœuvres.

Death of Lt. Col. J. Barrett-Lennard

BRITISH commercial aviation has lost one of its founders and strong supporters with the death of Lt. Col. John Barrett-Lennard, C.B.E., at the age of 71. Born in Devonshire in 1863, John Barrett-Lennard served both in the South African War and in the Great War. After the Armistice he became connected with aviation through the formation in March, 1920, of the Aircraft Disposal Co., Ltd., a syndicate which was formed by the Imperial and Foreign Corporation, Ltd., to dispose of all the surplus aircraft and aero engine material which that corporation had then recently bought for one million sterling from the Disposal Board of the Ministry of Munitions. Lt. Col. Barrett-Lennard became managing director of A.D.C., and for many years was instrumental, with Lt. Col. O. M. Darby, in selling British aircraft throughout the world. He was chairman of Handley Page, Ltd., and a director of Handley Page Transport, from 1921 to 1926, and when Imperial Airways, Ltd., was founded he became a director of that company, a post which he retained up to the time of his death.

Lt. Col. Barrett-Lennard.

Youthful Outlook

Few of those who came in contact with Lt. Col. Barrett-Lennard could have guessed his age. He retained in a remarkable way a youthful outlook on modern life, and was a very active member of the board of Imperial Airways, doing a great deal of travelling and going, a few years ago, as far afield as South Africa.

His co-directors will miss his quiet and sane guidance, which was born of a long and intimate experience of air transport from the day of its inception. Lt. Col. Barrett-Lennard did not live to see the full maturing of the services which he helped to start, but the foundations he established are destined to carry a great monument to his name.

Educating the Young

Cigarettes satisfy the mature-of-age and cigarette cards educate their children. Most children seem to know a great deal about aeroplanes already, but they will nevertheless want to collect the set of cards which has just been drawn for the proprietors of De Reszke Minors by Mr. Leonard Bridgman, the well-known aeronautical artist.

THE HAWKER HIGH-SPEED "FURY" modified since its last appearance in public. A later type engine has been fitted and the performance shows a marked increase.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

NOMENCLATURE OF AIRCRAFT—SWORDFISH

The official name of the Fairey torpedo spotter reconnaissance aeroplane fitted with Pegasus engine is "Swordfish."

R.A.F. BASES—CHANGE OF TITLE

The names of the following R.A.F. bases will be changed with effect from April 1, 1935:—

Present Name	*New name*
R.A.F. Base, Calshot	R.A.F. Station, Calshot.
R.A.F. Base, Gosport	R.A.F. Station, Gosport.
R.A.F. Base, Kai Tak	R.A.F. Station, Kai Tak.
R.A.F. Base, Leuchars	No. 1 Flying Training School.
R.A.F. Base, Malta	R.A.F. Station, Calafrana.
R.A.F. Base, Singapore	R.A.F. Station, Singapore.

No. 1 Flying Training School will continue to be administered by the Air Officer Commanding Coastal Area, as at present.

LONG SERVICE AND GOOD CONDUCT MEDALS

The Long Service and Good Conduct Medal has been awarded to the undermentioned airmen:—

W.O. Brown, S. R.; W.O.2's Tibbey, R., and Williams, L. G.; Flt. Sgts. Addison, J., Bartlett, H. W. F., Brown, C. G., Catton, F. H., Keates, J. T. W. B., Marsh, E. M., Mott, C. W., Pope, C. A., Tatham, F., M.M., Wilson, G., and Woods, H.; Sgts. Bennett, T. C., Burrows, J., Clements, E. N., Corser, W. F., Crebbin, J. E., Crook, B. R., Currie, H. V., Davenport, M. S., Dow, J. I., Dyer, E., Gould, H. E., Jones, E. J. H., Marshall, T., Sankey, L. B., Sawdy, E. W., and Turner, F. S.; Cpls. Blanc, J., Colverson, A. E., Cummins, T., Dale, A. G. H., Doggrell, R. T., Eagar, R. A., Farrow, C. R., Furlong, P., Hamer, F., Hobbs, H. W., Hyde, W. A., Marsh, P. T., and May, H. C.; Cpl. A./Sgt. Moss, W. G.; Cpls. Scott, E., Stares, A. E., Taylor, G. V., and Wills, E. L.; L./A/C. Williams, F. R.

AIR OBSERVERS

Additional instructions regarding the selection, training and qualification of air observers have been issued. While the difficulties experienced by C.Os. in recommending airmen for courses at the present time are fully appreciated, the Air Council wish to emphasise the high importance of the air observer scheme and the vital necessity for men of suitable type to be recommended in adequate numbers. C.Os. must realise the need for the careful selection of prospective air observers, and their recommendations should be made as thoroughly as are those of prospective airman pilots. Particular attention is to be paid to the candidates' keenness and aptitude for air work. In view of the increased requirements due to the expansion of the Royal Air Force, it has been decided that the conditions of eligibility shall in future be as follows:—

Airmen to be of the trades prescribed and to be sergeants, corporals, or *leading aircraftmen*. They must have been accepted for re-engagement or be considered likely to be suitable for re-engagement, and have completed not less than *six*, and not more than *twelve*, years' service on the date on which recommendations are due at the Record Office.

ELIGIBLE TRADES

Part-time air gunners may be recommended, but not full-time air gunners, armament or photographic instructors or airman pilots who have been remustered to their basic trades and are being kept in flying practice while liable for service as pilots in emergency. (As regards full-time air gunners, *see* below.) Candidates for training as air observers must have completed a minimum of fifteen hours' flying as passenger; this should, where possible, include aerobatics and periods spent in the normal bomb-aiming position in a service type of aircraft.

As indicated previously, airmen will be remustered as air observers and promoted to the rank of corporal (if below that rank) on posting to a unit for observer's duties after completing successfully the course at the Air Armament School, but they will remain on strict probation for twelve months thereafter.

Existing full-time air gunners who are eligible as regards rank, trade and length of service may, subject to the prior approval of the Officer i/c Records, be remustered as air observers without undergoing a further course of instruction. They may count satisfactory service as full-time air gunner in a squadron towards the prescribed probationary period.

SOUTH AFRICA FLIGHT

On April 24 four "Victoria" transport aeroplanes of No. 216 (Bomber Transport) Squadron will start from Heliopolis under the command of Wing Cdr. C. W. Mackey on a formation flight to Capetown. On the return journey the squadron will spend three days at Lusaka, the new capital of Northern Rhodesia, and will take part in the inaugural ceremonies there. The formation is due back at Cairo on June 11 after a journey of 11,500 miles.

THE ROYAL AIR FORCE BENEVOLENT FUND

The usual meeting of the Grants Committee was held at Iddesleigh House on March 21. Mr. W. S. Field was in the chair, and the other members of the Committee present were Mrs. L. M. K. Pratt Barlow, O.B.E., and Wing Cdr. H. P. Lale, D.S.O., D.F.C. The Committee made grants to the amount of £216 6s. The next meeting was fixed for April 2.

CAMPS AND AFFILIATIONS

SUMMER CAMPS OF CADRE AND AUXILIARY AIR FORCE SQUADRONS

While attending their annual camp the Cadre and Auxiliary Air Force Squadrons carry out normal service training.

Cadre Squadron.	*Camp.*	*Date.*
No. 500 (County of Kent) (B.)	Tangmere ...	May 12–25.
,, 501 (City of Bristol) (B.) ...	Manston ...	August 4–17.
,, 502 (Ulster) (B.)	,, ...	July 14–27.
,, 503 (County of Lincoln) (B.)	Hawkinge ...	July 14–27.
,, 504 (County of Nottingham) (B.)	,, ...	August 4–17.
Auxiliary Air Force Squadron.		
No. 600 (City of London (F.) ...	No. 3 Arm. Train. Camp	July 15–29.
,, 601 (County of London) (F.)	Lympne ...	July 27–August 10.
,, 602 (City of Glasgow) (B.)	No. 2 Arm. Train. Camp	July 15–29.
,, 603 (City of Edinburgh) (B.)	Tangmere ...	July 21–August 4.
,, 604 (County of Middlesex) (F.)	,, ...	August 3–17.
,, 605 (County of Warwick (B.)	Manston ...	August 4–18.
,, 607 (County of Durham) (B.)	,, ...	July 20–August 3.
,, 608 (North Riding) (B.) ...	,, ...	August 10–24.

ARMAMENT TRAINING CAMPS.

No. 1 Armament Training Camp, Catfoss. (Range at Skipsea).

March 4–April 6	No. 26 (Army Co-operation) Sqn.
March 25–April 27	,, 16 (A.C.) Sqn.
April 8–4th May	,, 9 (B.) Sqn.
April 29–June 8...	,, 12 (B.) Sqn.
May 27–July 6	,, 40 (B.) Sqn.
June 10–July 20	,, 207 (B.) Sqn.
July 8–August 17	,, 18 (B.) Sqn.
August 19–Sept. 28	,, 35 (B.) Sqn.
September 2–Sept. 28	,, 10 (B.) Sqn.
Fleet Air Arm Unit.	
May 6–May 25	,, 821 (F.S.R.) Sqn.

No. 2 Armament Training Camp—North Coates Fitties. (Range at Donna Nook).

March 4–March 30	No. 7 (B.) Sqn.
March 11–April 13	,, 4 (A.C.) Sqn.
April 1–May 4	,, 13 (A.C.) Sqn.
May 6–June 15	,, 142 (B.) Sqn.
May 6–June 1	,, 58 (B.) Sqn.
June 3–July 13	,, 33 (B.) Sqn.
July 8–August 17	,, 57 (B.) Sqn.
July 29–August 24	,, 99 (B.) Sqn.
August 19–September 28 ...	,, 15 (B.) Sqn.
August 26–October 5	,, 101 (B.) Sqn.
Fleet Air Arm Units.	
April 15—May 4	No. 820 (F.S.R.) Sqn.
June 17–July 6	,, 810 (F.T.B.) Sqn.
Auxiliary Air Force.	
July 15–July 29	,, 602 (City of Glasgow) (B) Sqn.

No. 3 Armament Training Camp—Sutton Bridge. (Range at Holbeach).

March 4—March 30	No. 41 (F.) Sqn.
March 4—March 23	,, 111 (F.) Sqn.

CAMPS AND AFFILIATIONS—*continued.*

March 25–April 27	... ...	No. 2 (A.C.) Sqn.
April 1–April 20	... ...	,, 3 (F.) Sqn.
April 22–May 11	... ...	,, 25 (F.) Sqn.
May 20–June 8 ...	... ...	,, 56 (F.) Sqn.
June 3–June 22...	... ...	,, 54 (F.) Sqn.
June 10–July 6 ...	... ...	,, 65 (F.) Sqn.
June 24–July 20	... ...	,, 29 (F.) Sqn.
July 22–August 10	... ...	,, 32 (F.) Sqn.
July 29–August 17	... ...	,, 17 (F.) Sqn.
August 12–August 31	... ...	,, 43 (F.) Sqn.
August 19–Sept. 7	... ...	,, 1 (F.) Sqn.
Sept. 2–Sept. 28	... ...	,, 23 (F.) Sqn.
Sept. 9–Sept. 28	... ...	,, 19 (F.) Sqn.
Fleet Air Arm Units.		
April 29–May 18	... ...	,, 800 (F.F.) Sqn.
May 13–June 1 ...	... ...	,, 801 (F.F.) Sqn.
Auxiliary Air Force.		
July 15–July 29	... ...	,, 600 (City of London) (F.) Sqn.

No. 1 Flying Training School—Leuchars. (Moorings at Newport. Range at Tentsmuir).

May 18–June 15* ...	No. 201 (Flying Boat) Sqn.
July 6–August 3* ...	,, 204 (F.B.) Sqn.
July 6–August 3* ...	,, 209 (F.B.) Sqn.
August 3–August 31* ...	,, 210 (F.B.) Sqn.
August 3–August 31* ...	,, 230 (F.B.) Sqn.

* Provisional dates.

Fleet Air Arm Units.	
April 29–May 18 ...	No. 822 (F.S.R.) Sqn.
June 17–July 6	,, 811 (F.T.B.) Sqn.

AFFILIATIONS OF R.A.F. FIGHTER TO R.A.F. BOMBER SQUADRONS.

The affiliations between Fighter and Bomber Squadrons, etc., consist of the practice of offensive and defensive tactics. This applies both to the Service and to the Auxiliary and Cadre Squadrons.

Squadron	*Affiliated to*	*Date.*
No. 41 (F.) ...	No. 35 (B.) Sqn. at Northolt ...	May 1–11.
		May 20–31.
No. 41 (F.) ...	No. 101 (B.) Sqn. at Northolt ...	June 10–16.
,, 111 (F.) ...	,, 35 (B.) Sqn. at Northolt ...	May 1–11.
		May 20–31.
,,	,, 101 (B) Sqn. at Northolt ...	June 10–16.

AFFILIATION OF R.A.F. FIGHTER TO R.A.F. FLYING BOAT SQUADRON.

Squadron	*Affiliated to*	*Date.*
No. 54 (F.) ...	No. 204 (F.B.) Sqn. at Roborough	May 6–25.

AFFILIATION OF R.A.F. FIGHTER TO R.A.F. ARMY CO-OPERATION SQUADRONS.

Squadron	*Affiliated to*	*Date.*
No. 17 (F.) ...	No. 13 (A.C.) Sqn.	April 29–June 30.
,, 25 (F.) ...	,, 2 (A.C.) Sqn.	May 13–June 30.
,, 29 (F.) ...	,, 4 (A.C.) Sqn.	April 29–June 30.
,, 56 (F.) ...	,, 16 (A.C.) Sqn.	May 1–May 19.
		June 10–June 30.

AFFILIATIONS OF FIGHTER SQUADRONS OF THE REGULAR AIR FORCE TO AUXILIARY AIR FORCE AND CADRE SQUADRONS.

Squadron.	*Affiliated to*	*Date.*
No. 1 (F.) ...	No. 602 (City of Glasgow) (B.) Sqn. at Abbotsinch	April 27–May 4.
	,, 605 (County of Warwick) (B.) Sqn. at Castle Bromwich	May 5–May 12.
,, 19 (F.) ...	,, 603 (City of Edinburgh) (B.) Sqn. at Turnhouse ...	April 27–May 5.
,, 23 (F.) ...	,, 501 (City of Bristol) (B.) Sqn. at Filton	April 27–May 5.
,, 3 (F.) ...	,, 607 (County of Durham) (B.) Sqn. at Usworth ...	May 4–May 12.
,, 32 (F.) ...	,, 608 (North Riding) (B.) Sqn. at Thornaby ...	May 4–May 12.
,, 65 (F.) ...	,, 504 (County of Nottingham) (B.) Sqn. at Hucknall	April 27–May 5.

ROYAL AIR FORCE GAZETTE

London Gazette, March 26, 1935

General Duties Branch

The following are granted short service commissions as Acting Pilot Officers on probation with effect from and with seniority of March 15:—D. K. Banks, D. M. Barrett, A. L. Bocking, M. S. Bocquet, N. A. N. Bray, J. G. Brown, G. A. Corder, L. E. Cryer, C. S. Darwood, S. Dodds, P. F. Edinger, J. M. Evans, T. M. Evans, D. I. C. Eyres, A. D. C. Fair, H. C. Farman, T. W. C. Fazan, G. V. Fryer, J. Fulton, G. E. Hawkins, D. J. Henderson, R. H. M. Heriot-Hill, R. R. Holder, S. Hook, P. I. Hoyle, P. D. R. Hutchings, C. G. Isacke, B. B. Jupp, N. G. Kendrick, J. A. Kent, A. de V. Leach, G. F. Lerwill, C. M. Lester, P. A. Lombard, F. E. Mack, E. J. C. Michelmore, O. R. C. Moseley, M. Nolan, D. Nolan-Neylan, A. B. Olney, J. A. O'Neill, J. E. Pelly Fry, E. F. Pippet, J. W. H. Radice, F. W. Richmond, J. Riley, H. R. Rittey, M. H. Romer, J. B. Russell, C. F. Scott, W. R. Selkirk, A. M. Smith, R. L. Smith, E. W. Spencer, E. A. Sprange, M. M. J. Stevens, F. M. Thomas, E. H. T. Thwaites, J. A. Tinne, J. D. S. Todd, A. J. Trumble, J. Vivian, J. F. Walker, R. N. Wardell, R. Williams, V. E. R. Williams, J. R. Wilson, R. A. Yule.

F/O. J. B. Tatnall is promoted to the rank of Flight Lieutenant (Feb. 28).

The following Pilot Officers are promoted to the rank of Flying Officer:—P. H. Holmes (Feb. 12); J. S. McLean, D. S. Radford (March 2).

P/O. A. E. Eady resigns his short service commission (Feb. 10).

Medical Branch

The following Flight Lieutenants are promoted to the rank of Squadron Leader:—A. F. Cook, L.R.C.P. and S. (March 16); E. Thompson, M.R.C.S., L.R.C.P. (March 22).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

F/O. K. V. Garside is transferred from class AA (ii) to class C (March 20).

The following relinquish their commissions on appointment to short service commissions in the R.A.F. (March 15):—P/O. J. M. Evans, F/O. J. E. Pelly Fry, F/O. J. A. Tinne.

AUXILIARY AIR FORCE

General Duties Branch

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—H. K. Macdonald is granted a commission as Pilot Officer (March 4).

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—The following Flying Officers resign their commissions (Feb. 4):—F. W. Hancock, G. F. M. Wright.

No. 607 (COUNTY OF DURHAM) (BOMBER) SQUADRON.—P/O. J. A. Vick is promoted to the rank of Flying Officer (March 4).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

General Duties Branch

The following are granted commissions as Flying Officers in class A (Feb. 4):—F. W. Hancock, G. F. M. Wright.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Squadron Leaders.—B. K. D. Robertson, A.F.C., to Administrative Wing, Cranwell, 12.3.35; for administrative duties. D. W. Clappen, to Reception Depot, West Drayton, 16.3.35; for Engineer duties with Central Trade Test Board vice Sqn. Ldr. L. J. MacLean.

Flight Lieutenants.—D. W. F. Bonham Carter, to Headquarters, R.A.F., Iraq, 2.3.35. C. L. Falconer, to Communication Flight, Iraq, Hinaidi, 2.3.35. D. R. Mitchell, M.B.E., to No. 2 Armament Training Camp, North Coates Fitties, 4.3.35. J. R. Adams, A.F.C., to Headquarters, R.A.F., India, New Delhi, 21.2.35. G. R. C. Spencer, to No. 23 Group Headquarters, Grantham, 16.3.35. P. M. Watt, to No. 608 (N. Riding) (B) Squadron, Thornaby, 21.3.35. E. S. Moulton-Barrett, to No. 230 (F.B.) Squadron, Pembroke Dock, 17.3.35.

Flying Officer.—E. J. Palmer, to No. 30 (B) Squadron, Mosul, Iraq, 7.3.35.

Acting Pilot Officers.—The following Acting Pilot Officers are Posted to R.A.F. Depot, Uxbridge, on 15.3.35; on appointment to Short Service Commissions:—D. K. Banks, D. M. Barrett, A. L. Bocking, M. S. Bocquet, N. A. N. Bray, J. G. Brown, G. A. Corder, L. E. Cryer, C. S. Darwood, S. Dodds, P. F. Edinger, J. M. Evans, T. M. Evans, D. I. C. Eyres, A. D. C. Fair, H. C. Farman, T. W. C. Fazan, G. V. Fryer, J. Fulton, G. E. Hawkins, D. J. Henderson, R. H. M. Heriot-Hill, R. R. Holder, S. Hook, P. I. Hoyle, P. D. R. Hutchings, C. G. Isacke, B. B. Jupp, N. G. Kendrick, J. A. Kent, A. de V. Leach, G. F. Lerwill, C. M. Lester, P. A. Lombard, F. E. Mack, E. J. C. Michelmore, O. R. C. Moseley, D. Nolan-Neylan, M. Nolan, A. B. Olney, J. A. O'Neill, J. E. Pelly Fry, E. F. Pippet, J. W. H. Radice, F. W. Richmond, J. Riley, H. R. Rittey, M. H. Romer, J. B. Russell, C. F. Scott, W. R. Selkirk, A. M. Smith, R. L. Smith, E. W. Spencer, E. A. Sprange, M. M. J. Stevens, F. M. Thomas, E. H. T. Thwaites, J. A. Tinne, J. D. S. Todd, A. J. Trumble, J. Vivian, J. F. Walker, R. N. Wardell, R. Williams, V. E. R. Williams, J. R. Wilson, R. A. Yule.

Stores Branch

Flight Lieutenant.—C. L. Thompson, to No. 3 (Indian) Wing Headquarters, Quetta, India, 25.2.35.

Flying Officer.—W. M. King, to Administrative Wing, Cranwell, 9.3.35.

Medical Branch

Flight Lieutenants.—P. D. Barling, to R.A.F. General Hospital, Hinaidi, Iraq, 15.3.35. P. J. McNally, to R.A.F. Institute of Pathology and Tropical Medicine, Halton, 18.3.35.

SWIFTLY from AUSTRALIA

How H. L. Brook, in a "Gipsy"-engined Miles "Falcon," broke the Solo Record : His Story in an Interview with "Flight"

LAST Sunday afternoon, at 3.55 p.m., the original Miles "Falcon" landed at Lympne, having flown in 7 days 19 hr. 50 min. from Darwin, North Australia, with Mr. H. L. Brook, of Harrogate, at the controls. The pilot thus beat the unofficial "solo" record of Mr. C. J. Melrose by 13 hr. 10 min., and the officially recognised performance of Mr. J. A. Mollison by 1 day 2 hr. 25 min. The shortest time for the Australia-England trip is still, of course, the 6 days 16 hr. 10 min. of Cathcart Jones and Waller in a "Comet."

After leaving Darwin at 5.30 a.m. on Sunday, March 24 (Australian time), Mr. Brook's time-table was as follows:—Sunday night, arrived Rambang; Monday, Penang; Tuesday, Rangoon; Wednesday, Calcutta; Thursday, Karachi; Friday, Athens; Saturday, Rome; Sunday, Marseilles (9.25 a.m.); Lympne (3.55 p.m.).

The Timor crossing, he told a member of the staff of *Flight*, was "rotten," with rain, low clouds and heavy head winds. On the trip from Penang he landed on the delta near Calcutta. Over the Sundarbans low clouds and darkness caused him to take this measure rather than to fly on, possibly missing Calcutta, and, as he put it, perhaps making a crash landing through shortage of petrol.

Perhaps the worst section of the trip was that between Athens and Rome, particularly the portion over the channel of Corfu, where a gale was encountered. At Brindisi Mr. Brook was advised not to proceed, but he pushed on and crossed the Apennines in a snowstorm.

And what of the man himself? He is a thirty-eight-year-old Yorkshireman, who, despite the newspaper stories, has never been an accountant in his life. When he was younger he indulged in motor racing and later built a few sailplanes and gliders. Then he joined the York County Aviation Club and went solo after four hours' instruction. He next bought Mr. J. A. Mollison's "Puss Moth" *Heart's Content*, and set out for Australia to survey the route to Melbourne, for he had decided to enter the MacRobertson Handicap. But ice formation forced the "Puss Moth" down on a mountain side in the Cevennes. Neither Brook nor the "Major" (which, it should be remembered, had already been flown over the South Atlantic) was rendered *hors de combat*, however. The engine was salvaged and Brook brought it back to England, where it was installed in the first of the Miles "Falcons" which then was fitted with extra tanks for the race. During the event it carried a lady passenger and a large helping of appalling luck (no connection is suggested between the two facts!). Suffice it to say that the Australian trip, a large portion of which was made in easy stages, took about twenty-six days. During his stay "down under," Brook worked until the "Falcon" and its engine were in tip-top condition before starting his almost unheralded flight.

Mr. Brook being congratulated by Flt. Lt. "Tommy" Rose on his arrival at Lympne.

Of travelling in the "Falcon" he says that, compared with flying in an ordinary aeroplane with open cockpits, it was "like travelling in a saloon car instead of on a motor cycle." The veteran "Gipsy Major" was run throughout the flight at 2,100 r.p.m.

Among other items of equipment which had a share in the successful performance were Castrol oil, B.T.H. magnetos, Claudel-Hobson carburetters, K.L.G. plugs, Smith's instruments, Sestrel compass, and Reid and Sigrist Turn and Bank indicator. The tyres and brakes were Palmer and Bendix respectively, and the cushions Moseleys.

SEADROMES in SIGHT?

SPEAKING at the Women's Engineering Society in London on "The Case For and Against Seadromes," Mr. Nigel Tangye last week gave an admirable description of the seadrome project, and discoursed on its potentialities without losing sight of possible competitive systems of transport over the Atlantic.

Some highly interesting facts and figures were given by Mr. Tangye. For example, he said that on the thirtieth parallel of latitude (the region in which the seadromes would be moored) fog was likely to be experienced on not more than 6½ days by each seadrome. (Mr. Williams, of the Seadrome Ocean Dock Corporation, later pointed out that fog at sea usually accompanies calm water conditions.) The average monthly wind was between 21 m.p.h. and 34 m.p.h., and the maximum wind recorded was 72 m.p.h. Temperatures ranged from 40 to 70 deg. Admiral Mark Kerr, who was in the chair, mentioned a scheme of Professor Baird's by which vision through fog could be multiplied sixteen times, which might have some application.

There would be no tax on the petrol stored in the seadrome. Actually, the Standard Oil Company of America had already quoted a figure of 5½d. per gallon. Mr. Williams said that a leading authority on law in America had decided, after long study, that while a seadrome was being towed out to its anchorage it was to be regarded as a ship, but as soon as it was anchored it became "territory."

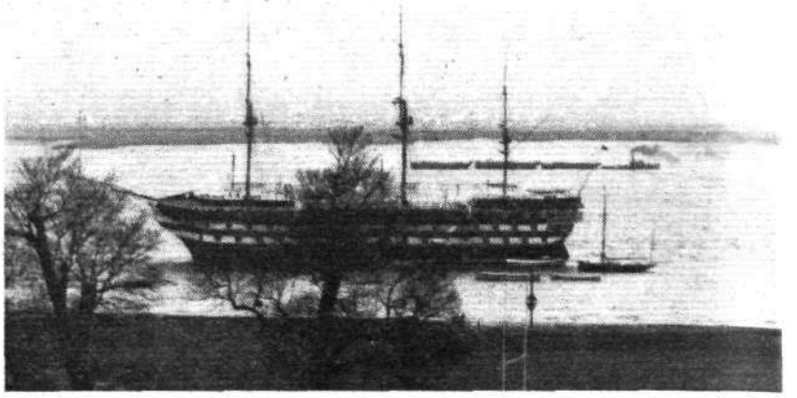
A question which is frequently asked is how a vessel bearing fuel, supplies, etc., would be able to transfer its cargo to the seadrome in seas which caused it to roll and pitch while the seadrome remained stationary. According to Mr. Tangye it is expected that the employment of a system of horizontal perforated pipes running out from the seadrome at a considerable depth beneath the surface of the water and ejecting air at high pressure through the perforations would form a calm expanse of water for the reception of the attendant vessel. Experiments with pipes of this nature and a rowing boat were shown in a film and certainly convinced one of the possibilities of the scheme.

It is hoped that England, France, and America will join forces in putting the seadrome project into practice. America, definitely, is willing. A commission from France has been in Washington for three weeks confirming with the American authorities the claims made by the European representatives for the seadrome.

England, it would appear, is "hanging fire" pending the completion of the Short-Mayo composite aircraft.

CIVIL FLYING TRAINING AFLOAT

Inauguration of H.M.S. Worcester Scheme for Cadets



Above is seen the training ship, H.M.S. *Worcester,* lying off Greenhithe, Kent. To the left the Civil Aviation Ensign is being broken on the roof of Ingress Abbey, the shore headquarters, by Cadet Jones, son of the well-known pilot of Imperial Airways, to mark the inauguration of the new course of training. (*Flight* photograph.)

PREPARATORY training for a career of civil flying will probably, in time, become a regular part of the syllabus of all leading schools. At present the openings are limited, but daily they are increasing in number. The idea of taking up this form of elementary education has occurred first among educational establishments to the authorities of the training ship H.M.S. *Worcester,* which lies in the Thames off Greenhithe, Kent. It has originated with the Captain Superintendent, Commander G. C. Steele, V.C., R.N. (Retd.), who is himself an old *Worcester* boy.

The scheme has the official patronage of the Royal Aeronautical Society and the Air League of the British Empire, and has been approved by the Director General of Civil Aviation at the Air Ministry and by the Board of Trade. The idea is that cadets in the ship who intend to select civil flying as a career shall be instructed in such subjects as signalling, meteorology, navigation, instruments, and electricity, all of which are already part of the education of an officer of the mercantile marine. They will also receive elementary instruction in rigging an aeroplane and fitting an engine. Officially the cadets will retain the rank of Cadet, Royal Naval Reserve, and will continue to wear naval uniform, but in the ship they will be known as Air Cadets, and when they qualify for a good conduct badge this will take the form of a wing instead of the anchor worn by the other cadets.

After leaving the *Worcester,* the official scheme is that the boys shall go on to Air Service Training at Hamble to qualify for their "B" licences, but they may select other training centres is they wish to do so. While on the *Worcester* there will, under present arrangements, be no instruction in flying, although occasional passenger flights may be arranged at Gravesend aerodrome or elsewhere.

The scheme was officially inaugurated last Monday, when an "Atlas" aeroplane with "Jaguar" engine, which has been presented by the Air Ministry, arrived at Greenhithe and was taken into the shore headquarters at Ingress Abbey. This is a fine old country house, built partially of stones taken from a former London Bridge. It is surrounded by ample grounds where the cadets have their playing fields.

The arrival at Ingress Abbey of an "Atlas" aircraft with "Jaguar" engine, presented by the Air Ministry. These will be used for ground instruction only. (*Flight* photograph.)

The R.A.F. Jubilee Review

The review and fly-past of R.A.F. squadrons on the occasion of the Silver Jubilee of the King will be held on July 6, at 2 p.m., *Flight* understands, at Duxford Aerodrome, Cambridgeshire. The squadrons will assemble beforehand at Mildenhall, which is only a few miles away.

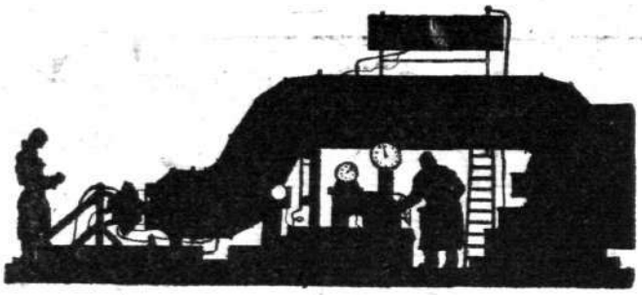
The public will be admitted to Duxford, and perhaps some of them will be able to see the squadrons take off from Mildenhall, but the real show will be at Duxford.

Death of Major B. S. Benning

Flight regrets to record the death of Major B. S. Benning, an engineer of the aircraft department of the Marconi Company, who was struck by a propeller when starting an engine at Croydon last week. Major Benning, who was forty-two years of age, was a member of the aircraft department of the Marconi Company, and was also an experienced pilot, having served in the Royal Naval Air Service and the Royal Air Force during the War, and having qualified again in civil life for his "A" pilot's licence two years ago.

Major Benning was a flying instructor at Cranwell during 1916 and 1917, and early in 1918 he went to France as a flight commander with No. 57 Squadron; from May, 1918, until autumn, 1919, he was in command of No. 49 Squadron in France. He joined the Marconi Company in 1912, and played an important part in the development of wireless communications in many parts of the world, including Chile, Mexico, India and Greece. From 1925 to 1932 he was the special representative of the company in Japan, where he was responsible for the installation of broadcasting stations.

Major Benning's home was at Surbiton, Surrey, and he leaves a wife and two children.



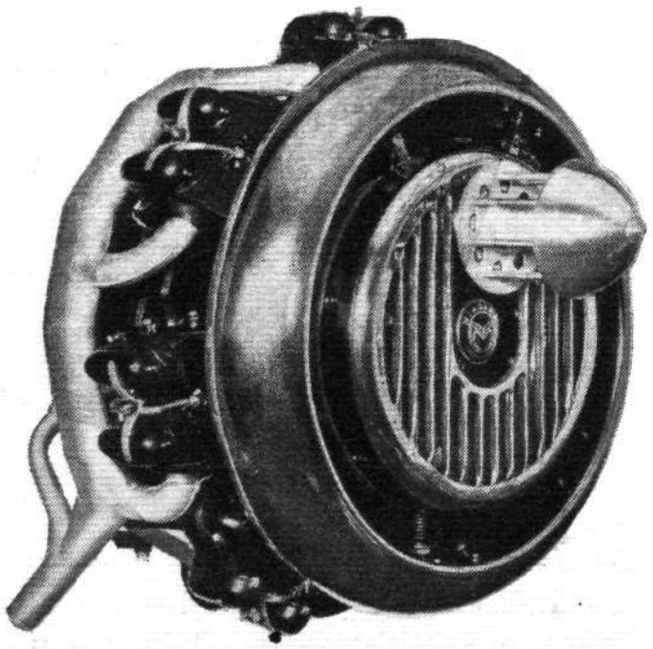
FULL THROTTLE

at maximum permissible r.p.m. for 50 hours

POBJOY · NIAGARA

A standard "Niagara" engine has been officially tested under the most severe conditions possible, namely—50 hours at full throttle in 10 hour non-stop periods. $9\frac{1}{2}$ hours at maximum permissible r.p.m. (3500) followed by 5 minutes at 2850 r.p.m. with air velocity over engine reduced to 87.7 m.p.h. (take off conditions) and 25 minutes under "climb" conditions.

NO ADJUSTMENTS WERE CARRIED OUT THROUGHOUT THE RUN. NO FALLING OFF IN POWER OCCURRED, AND NO REPLACEMENTS WERE NECESSARY AFTER STRIPPING.



POWER WITH POBJOY..

THE MOST EFFICIENT OF ALL LIGHT AERO ENGINE

PRIVATE FLYING

Unexpected Obstacles

LORD SEMPILL, CONTINUING THE STORY OF HIS AUSTRALIAN FLIGHT, DESCRIBES SOME UNFORESEEN SNAGS — SUCH AS GRASSHOPPER PLAGUES

LEAVING Melbourne on my tour of the Eastern coast en route for New Guinea, the first stop was Canberra, Australia's national capital. Canberra is served by an aerodrome actually only 3½ miles east from the centre of the city, although it is nearly 5 miles by road. It is licensed for all types of land planes, and lies some 2,000 feet above sea level. The landing area is 800 yards by 750 yards, and the surface, although good, is liable to be soft and sticky in wet weather.

Canberra, the youngest of the world's capital cities, is delightfully planned. Containing many fine buildings, it has as its dominant feature the splendid Federal Parliament House, beautifully situated on sloping ground known as Capital Hill. Australians are justly proud of their new capital, which may rightly be termed the world's most unique city.

During a short stay in Canberra I had the privilege of being the guest of the Governor-General, and of meeting many interesting people, including the Prime Minister and members of the Government. While there I was invited to attend a luncheon given in honour of A.V.-M. Sir Philip Game, the retiring Governor of New South Wales, who was the first ex-officer of the Royal Air Force to hold such an appointment.

The Beauty of Sydney

FROM Canberra I flew on to Sydney, the largest city in the State, boasting, like Melbourne, a population of over a million. Sydney is a beautiful town with architectural features which give it a cosmopolitan setting. Approaching by air from the sea one gains from its high buildings the impression of New York in miniature. Its wonderful bathing beaches are famous the world over, and the magnificent Sydney Harbour Bridge is a very proud possession. I did not stay long in Sydney on the northward journey as I was anxious to get to Brisbane in time for the inauguration of the new Imperial Air Mail Service.

Leaving Mascot, I covered the five hundred miles to Brisbane without incident. In Archerfield aerodrome Brisbane possesses one of the finest airports in the Commonwealth, its dimensions being over 1,000 yards from north to south and nearly 900 yards from east to west. The opening ceremony of the new Air Mail Service was performed by H.R.H. the Duke of Gloucester, the machines used on this occasion being two D.H.50's with "Jupiter" engines. Both aeroplanes and engines were really in splendid condition, and anyone not realising that these were old aircraft would certainly have classed them as new machines just introduced for this Imperial service. Brisbane is an important air transport centre, for not only is it the eastern terminus of the Imperial service to Darwin, but is the junction of air routes to the north as far as Yacamunda and southwards to Sydney and Bega

Leaving Brisbane on the next stage of my journey I hoped to reach Townsville during the day, and made for Rockhampton, where I intended to refuel. On the way I made a point of passing over Bundaberg, which I had long known as the home of my old friend Hinkler, one of the greatest air pioneers Australia or any other country has ever seen. Although Hinkler did most of his flying in other parts of the world, he had toured the Commonwealth by air as early as 1921, and in 1927 set up a record for a solo flight from England in an Avro "Avian," when he had a great reception in his native land. A few days after passing his birthplace I sent his mother (who must be getting quite an old lady now) a wire containing Christmas and New Year wishes.

In making for Rockhampton, which is some way inland from the coast, I found it necessary to land on a station to check my position, as the maps I had were rather too sketchy for clear navigation. The aerodrome at Rockhampton is privately owned and there is a fair amount of flying activity. When I was there the field was plagued with grasshoppers, hundreds of which got jammed up in the air scoops and cowling generally as I took off, and I was a little nervous that one or two might get into the carburetter from the air intake and upset carburation. Several of the machines in use there have a guard over the intake, and the necessity for this was certainly emphasised. In considering a proper precaution against this contingency, one might couple with it the desirability of finding a satisfactory method of ensuring dust exclusion.

Night in the Open

AFTER refuelling at Rockhampton I left for Townsville, but was delayed by strong head winds, with the result that I was still some seventy miles south of that town when it became dusk. I knew that Townsville was an unused and unlit aerodrome and that there were hills about, so I decided to land at a small village, which I found to be Inkerman.

On landing I found that I could telephone, and at once advised the authorities at Townsville of my whereabouts. There was naturally little accommodation in such an out-of-the-way place, but I managed to discover a dry goods store where I could buy some fruit and drink. After a meal, of which I was very much in need, I made my camp by the "Puss Moth" and tried to sleep. In spite of every precaution, however, I could not keep the biting ants and sand flies from giving me a lot of attention, the results of which lasted about ten days.

A Dust Storm

TAKING off early next morning I soon reached Townsville, where I was very kindly received, the representative of the Vacuum Oil Company meeting me and thoughtfully providing breakfast. At Townsville I met Mr. MacDonald, who is a jeweller in Cairns, some two hundred miles to the north of that town; he is the owner of a "Puss Moth" and a "Gipsy Moth" which he uses for commercial work, and he had brought an elderly lady down by air to Townsville to be operated upon for appendicitis. At that time there was a heavy dust storm over the whole area, and his "Puss Moth" was covered with dust which was thickly sticking to the leading edge of the planes and other parts. He told me he had neve known such bad conditions from the point of view of visibility, and gave me much useful information. The grasshoppers were just as great a nuisance in taking off at Townsville as they had been at Rockhampton.

FROM THE CLUBS

Events and Activity at the Clubs and Schools

CAMBRIDGE

Ten members of the Civil Aviation Service Corps, four of them soloists, flew on Sunday. Mr. Ayling has joined the instructional staff. The workshops have finished off two C. of A's and two more are coming along this week. Flying times were 29 hr. 30 min. dual and 8 hr. 20 min. solo.

CASTLE BROMWICH

Fying times for the week amounted to 14 hr. 20 min. dual and 23 hr. 10 min. solo. Mr. Reeves Quann made his first solo flight. Visitors included Mr. Cave from Redditch in a "Moth," Mr. Blackburn in a "Bluebird," Mr. Palmer in a "Fox Moth," and Mr. Hill, of Walsall. Mr. Percival flew over in a "Gull."

BROOKLANDS

First solos last week included one by Mr. Scherpenhuysen. Four new pupils joined: Messrs. Madders, Firth and Pretorious and Miss Brice.

The total hours last week amounted to sixty-five, made up of 35 hours dual and 30 hours solo. The following members of the club sat for their second-class navigator's certificate: C. O'Connell, J. A. Valetta, J. S. Douglas (instructor) and Mr. Khan Aga. Mr. Ashton, the ground instructor, sat for his first-class navigator's certificate. Mr. Alliott is taking Mr. Douglas's place as instructor while the latter takes his examination.

HATFIELD

Four "Moth Majors" bearing the new Austrian registration letters "OE" were flown last week to Vienna. Herr Eltz, the De Havilland representative in Austria, and three other Austrian pilots were in charge, and delivered the machine to the Austrian Aero Club.

New members of the London Aeroplane Club include Messrs. A. G. O. Hodgson, C. E Attrill, and G. Lenanton. Messrs. V. G. Parker and R P. J. Leborgne obtained certificates for instrument flying. The Club's flying time for last week was 69 hr. 35 min.

Flt. Lt Middleton has become a member of the Royal Air Force Flying Club.

CINQUE PORTS

One of the visitors during the week was Mr. Sluyter, a good friend of the Club and assistant instructor of the Amsterdam Flying Club. On Monday, Mr. J. G. Brown, the chief ground engineer, went to the assistance of *Heracles* which, having landed at Lympne owing to bad weather, had developed slight engine trouble

Flying times showed an improvement, amounting to 32 hours dual and solo Miss H. B. B. Yardley made her first solo flight, and Mr. J. M. Marshall joined the Cinque Ports Club in order to learn to fly.

The year ending December 31, 1934 was one of improvement and increase for the Cinque Ports Flying Club. Membership increased from 190 to 271, and a total of 1,533 hours, dual and solo, were completed by the three club aircraft Thirty-nine "A" licence and three "B" licence tests were passed by members. Mr. L. H T. Cliff was engaged a third instructor, and will rejoin the staff at Easter. High lights of the year included the International Aero Rally in September, and the races for the Folkestone Air Trophy and for the Cinque Ports Wakefield Cup Mr. Ken Waller was released for various periods in order to make his outstanding record flights to and from Australia, and between Brussels and Belgian Congo During the nine months of the subsidy financial year (from April to December, 1934) the Club exceeded the maximum, while during the twelve months of the preceding subsidy financial year it was only slightly short.

LIVERPOOL

High winds made flying impossible on two days of the week, but nevertheless 41 hr. 15 min. flying was recorded.

KENT

Flying time at the Kent Flying Club last week totalled twenty-five hours. Councillor Rowe, an old night flying pilot, has joined the club and Mr. Klein has passed his "A" licence tests.

YORKSHIRE AVIATION

Twenty-four hours were flown during the week on Yorkshire Aviation Services school machines and Mr. F. H. Robinson completed his "A" licence tests. Visitors included Mr. Scholes, Flt. Lt. Gray, Mr. Spiers, and Mr. and Mrs. Hawden. Messrs. R. Clough and Chapman have become pupils.

HERTS AND ESSEX

Work nas just been commenced on an all-steel hangar measuring 70 ft. × 50 ft. Equipment will include a spraying plant and an engine test bench to take all types of engines. On its completion the workshop will be able to undertake complete overhauls and repair work.

The competition for the 55 Squadron Cup will be held on Sunday, April 7. It is open to all members of the Club, and will be in the form of a triangular cross country with marks for the landing and approach on the return.

Flying time during the past week amounted to 55 hr. 45 min. of which 33 hr. 15 min. was solo.

NORTHAMPTONSHIRE

Last Sunday a joy-riding and trial lesson day was arranged at Sywell, and many took advantage of the reduction in prices. Eight people took trial lessons, while the machines were kept busy throughout the day with joy rides. The fine weather has brought the associate members to the club in force and the two hard tennis courts have been in great demand.

Midland Airways, Ltd., have also had a busy week, especially on Friday, when passengers were taken to the Grand National.

Preparations are now complete for the opening of the season display on April 7

NONE BUT THE BRAVE . .: Cutting the "Cometic cake after the marriage of Miss Florence Desmond and Mr. T Campbell Black. Sir MacPherson Robertson and Mr. C. B. Cochran are on the right and left respectively.

WITNEY AND OXFORD

Photographic work has been done on behalf of the Oxford Preservation Trust Society. Mr. W. Spencer has obtained his ground engineer's "A" licence, and Mr. B. Walker has secured his "A" and "C" licences. There was one first soloist during the week, Mr. W. E. H. Noel. Flying times were 12 hr. 10 min. dual and 10 hr. 20 min. solo.

YORK COUNTY

During March the York County Aviation Club, Ltd., flew 63 hours at Sherburn-in-Elmet, and Miss Maurice and Mr. Pilkington made first solos. Two machines flew to Nottingham for the club dance, and Mr. Humble, the honorary instructor, has presented the club with a fire tender—a very apposite gift! The next dance will be held on April 13.

Mr. H. L. Brook, who has just broken the Australia-England record with a Miles "Falcon," was trained at Sherburn—which appears to be a pretty good advertisement for the instruction.

READING

A further landing competition in the series with Brooklands Aero Club, to determine the temporary ownership of the pint tankard, is scheduled to take place next Sunday at midday. Probably it will be held at Hanworth. With the advent of summer time on April 14, there will be a "dawn patrol" between 8.0 and 8.30. All invaders will be as welcome as usual in the clubhouse.

The Gerald Royle Memorial Aeroplane has been ordered. A handsome donation has been made to the fund by Viscount Wakefield.

Dr. Robello took delivery of his "Hawk Major" last week, and on Friday left for Lympne in company with F/O. J. F. Lawn. On Saturday they took off for Lisbon where they arrived the same evening, having made the trip from Lympne in eight hours' flying time. The "Merlin" was flying a great deal during the week-end.

HANWORTH

Due, no doubt, to improved weather conditions, the flying time for the week was as much as 52 hr. 10 min.

Messrs. E. Sutton and G. Chatellon successfully completed their first solos. Mr. R. Everett, who has received his "Puss Moth" from the A.E.M. shops, has commenced a blind flying course under the instruction of Flt. Lt. Duncanson. Mr. J. H. Hill has completed his instrument flying course, and Mr. T. G. Hovenden, brother of Cdr. Hovenden, an old Hanworth member, has become a member.

NORFOLK AND NORWICH

The arrival of the Club's new "Fox Moth" has stimulated great interest. In purchasing this machine the Club aimed to provide for Norwich a link with the airline companies and to provide a special charter service. The first commercial charter flight by the "Fox" was made to Skegness.

A number of visitors arrived by air for the annual dinner last Friday. They included Lt. O. Cathcart-Jones and Miss M. Neison in a "Puss Moth," Mr. R. B. Finney in a "Moth," and Mrs. F. Crossley and Flt. Lt. P. Fair in a Desoutter.

Mr. H. N. Holmes, the Club's president, presided over the dinner, and proposed the "City and County." The Lord Mayor, in responding, said that people would owe a great deal to the airport before they were much older. Mr. H. P. Gowen congratulated the Club on arranging a direct air service between Norwich and Leicester. He said it would be impossible not to recognise the important part played by Messrs. Boulton and Paul. Capt. A. A. Rice, M.C., felt that citizens were, at last, appreciating the work done by the Club. Mr. P. E. T. Carill-Worsley proposed "The Guests," and Lt. Cathcart-Jones, replying, commended the Club for its scheme for the training of public school boys. He added that he thought the city could do a bit more for civil aviation. The Club should not be burdened by the cost of lighting and beacons. Mr. Alan Colman was presented by the president with the trophy he had won for cross-country flying.

SOUTH OF THE DOWNS

British Air Transport's New School Aerodrome and Club at Redhill : Blind Flying, Night Flying, Wireless and Autogiro Instruction

OBSERVANT pilots wending their way along the railway lines between Tonbridge and Dorking—*outside* the controlled zone—will have noticed the appearance, during the last few months, of an aerodrome about a mile and a half south of the line and some two miles from Redhill junction. Placed as it is, no wandering "Bradshaw pilot" could fail to locate it, and, though not intended as an alternative airport, it will be extremely useful on occasions when the north-bound pilot is unable to get through any of the gaps in the Downs—whether Q.B.I. is in force or not.

The site was purchased by British Air Transport, Ltd., in May, 1934, and instructional flying started towards the end of November after En-Tout-Cas had done their work, and after a clubhouse had been built and a large hangar erected by Boulton and Paul. The site had actually been planned by the Redhill Council, but both the aerodrome and a proportion of the surrounding land now belong to B.A.T., who, it will be remembered, left Croydon in 1932 when instructional flying was prohibited. Since that time the company has been at both Addington and Gatwick, and three new directors, Messrs. J. H. Edwards, A. A. Douglas and A. G. Douglas have joined the board.

Redhill aerodrome is, even now, large enough for all proposes (with a maximum run of 900 yards), but in due course, when the Godstone R.D.C. have moved out of a projecting area, the longest run will be in the region of 1,100 yards. Meanwhile the approaches are very clear indeed, and the site well away from London's environs.

The B.A.T. School is, of course, well known, and of their "B" licence pupils twelve are now with Imperial Airways. However, in order to become eligible for a subsidy, with the possible reduction in flying rates, the company has since formed the Redhill Flying Club with a purely nominal subscription. For those pupils who wish to live near the scene of their crimes, the Elizabethan Ham House Club, within walking distance of the aerodrome, is also available. A car will be sent on request to any of the four stations in the vicinity.

At present the fleet consists of four "Moths" ("Gipsy I") and a C.30 Autogiro, but a "Puss Moth," a Miles "Hawk" and a "Fox Moth" are all available for the use of accredited members. Flying rates vary from £1 15s. to £3 on hour, according to the type flown and the instruction required. The school is approved for blind flying instruction and the complete course costs £15. "B" licence night flights can also be arranged and night landing instruction carried out. In due course it is probable that the aerodrome will be laid out with boundary lights and a flare path, but meanwhile pupils are taken to Lympne for night landing practice.

Since the company moved to Redhill a wireless school has been started, in charge of Mr. J. H. G. MacArthur, who has had a wide experience of the work both on the ground and in the air. After ground instruction pupils are taken up in the "Fox Moth," which is being bonded for wireless and in which will be installed a receiver, a transmitter and a Marconi-Robinson homing device.

The hanger, which is centrally heated, is fully equipped for dealing with repair and C. of A. work. Of the engineers in charge, one, Mr. E. Parker, has been with Instone and Imperial Airways since 1920, and another Mr. F. Bevilaqua, started with the Hall Aviation Co. in 1912! Since that time he has been in the Service and with both Faireys and De Havillands for long periods.

The chief instructor, Mr. R. F. Bulstrode, has been with the company since 1933, and the second instructor, Mr. J. R. Hatchett, has actually done some 9,600 hours' flying both in the Service and in civil aviation. Between 1921 and 1929, incidentally, he flew the mails between Seville and Morocco, and joined the company last year.

For a very good reason most people look on Croydon aerodrome as the hub of civil aviation, and the B.A.T. agency there remains in the hands of Capt. Fry, O.B.E. Although little or no flying is actually carried out from Croydon the company realises that the airport will remain the focal inquiry point for the newcomers to aviation.

Blind Flying in the Midlands

Another school has now been added to those provisionally approved by the Air Ministry for courses of instrument flying. This is the Worcestershire Flying School, Tilesford aerodrome, Worcester, details of which were given in *Flight* of August 30.

A NOTABLE YEAR

The Royal Aero Club, at its Annual General Meeting, Reviews Twelve Months' Work

AN outstanding year in British aviation was reviewed at the annual general meeting of the Royal Aero Club, held in London on Wednesday, March 27. Lord Gorell was in the Chair, and before submitting the report on the year's work, he welcomed the presence at the meeting of the Duke of Atholl, the President of the Club.

The report showed that private flying had made definite progress during the year; 1,168 new "A" licences had been taken out, as against 976 for the previous year, while new "B" licences totalled 137, as against 142. At the end of the year the current licences numbered 2,979 "A" (2,609 in 1933) and 498 "B" (441 in 1933).

Dealing with aircraft, the total number on the register at December 31, 1934, was 1,174, of which nearly 500 were privately owned. During the year the Club had granted 922 aviators' certificates.

There had been a substantial increase in air touring abroad, and 548 carnets had been issued during the past year. They wished again to record their gratitude to Viscount Wakefield, who in 1933 gave a donation of £1,500, a certain sum from which is set apart each year for the furtherance of air touring.

To Encourage Air Touring

To further the cause of air touring, the Club had appointed a special Private Owners' and Air Touring Committee, solely for the purpose of watching and assisting this development. Among the many questions handled by this committee, and subsequently by the main committee of the club, were the following:—

Convention relating to the cautionary arrest of aircraft, purporting, among other things, to facilitate the resumption of a journey after alighting; attempt to relieve the aircraft users of the heavy petrol tax burden; the de-rating of civil aerodromes; unification of landing and garage fees; Customs carnets—to bring into use an improved form of carnet; Conventions relating to aerial collisions and salvage of aircraft—limitations, etc., of salvage charges; barriers to air traffic—an attempt to stir public opinion at home and abroad against this unnecessary impediment to air travel; signals used in air navigation—standardisation of indications day and night in distress and otherwise relating to aircraft; entertainment of foreign visitors; passports—recommendation for a larger passport capable of carrying more visas, etc., before renewal; recommendation for Customs facilities at a larger number of aerodromes.

Apart from meetings in London, air touring matters had been discussed with other national clubs at conferences in Paris and Washington, and thanks were due to Colonel O'Gorman, Major Goodfellow and Major Darwin, who had given up a large amount of time in attending these conferences.

International agreement had now been reached with certain European countries to waive landing and garage fees to private air tourists—members of national clubs—visiting other countries. The Italian Government was responsible for this innovation, the extension of which would bestow a great benefit on the private air tourists of those countries which give reciprocal facilities. The speaker then outlined the identity card scheme, which was fully dealt with in last week's issue of *Flight*.

Lord Gorell said that during the year the Royal Aero Club and the Automobile Association agreed to co-ordinate their work on air touring. Since August 1, 1934, members of the R.Ae.C. or the A.A., or clubs affiliated thereto, had been able to obtain identical services from either body on payment of a small annual fee, in return for which they received an Air Touring Card.

After touching upon the Club's work in connection with the Gorell Report, Lord Gorell went on to review the outstanding British aviation achievements of the year. He spoke of C. W. A. Scott's and T. Campbell Black's Melbourne Race victory, which also gained for them the first Capital to Capital Record granted by the F.A.I., an R.Ae.C. Gold Medal, and the Britannia Trophy; of Jones' and Waller's long-distance flights, in recognition of which an R.Ae.C. Silver Medal had been awarded, while Waller had received the Segrave Trophy for 1934; and of C. J. Melrose's Australia-England flight.

Special thanks, said Lord Gorell, were due to the England-Australia Race Committee and its Secretary (Comdr. Perrin) for its work, and the Club expressed gratitude to the officials on the course from Mildenhall to Koepang.

Dealing with gliding, the Chairman remarked that during the year ninety gliding certificates had been issued, forty-five in category "A," twenty-four in "B," and twenty-one in "C." He then reviewed the duration, altitude, and distance records, standing respectively to the credit of E. L. Mole, G. N. Buxton, and G. E. Collins.

Among other facts recalled by Lord Gorell was that during the past year the Hospitality Committee had entertained nearly one hundred private air tourists from abroad. These arrangements entailed a large amount of work and expense which fell upon the members of that Committee. The Club extended its warmest thanks to those who had assisted in these arrangements, to which it attached great importance in view of the lavish hospitality which is always extended to British air tourists abroad.

The remaining item on the agenda was the election of the President, Vice-president, and committee. The Duke of Atholl was re-elected President, and Viscount Wakefield and Lt. Col. O'Gorman Vice-presidents. Nine members were elected to the committee, as follows: Mr. A. J. A. Wallace Barr, Comdr. James Bird, Ft. Lt. C. Clarkson, Lt. Col. M. O. Darby, Lord Gorell, Capt. A. G. Lamplugh, Lt. Col. Sir Francis McClean, Mr. F. Handley Page, and Mr. G. H. Wilson-Fox.

A Stockholm Aero Show

An International Aero Show is to be held in Stockholm from May 15 to June 1, 1936. The last Stockholm Aero Show (I.L.I.S.) was held in 1931. Owing to the fact that at that time Stockholm had no aerodrome, the participation was limited by transport difficulties. By 1936 the new municipal aerodrome will be ready (of an area of about 200,000 sq. yd.), so that intending exhibitors will be able to fly their machines straight to the aerodrome, the buildings of which will house the exhibits. H.R.H. the Crown Prince of Sweden has consented to let the show be held under his patronage.

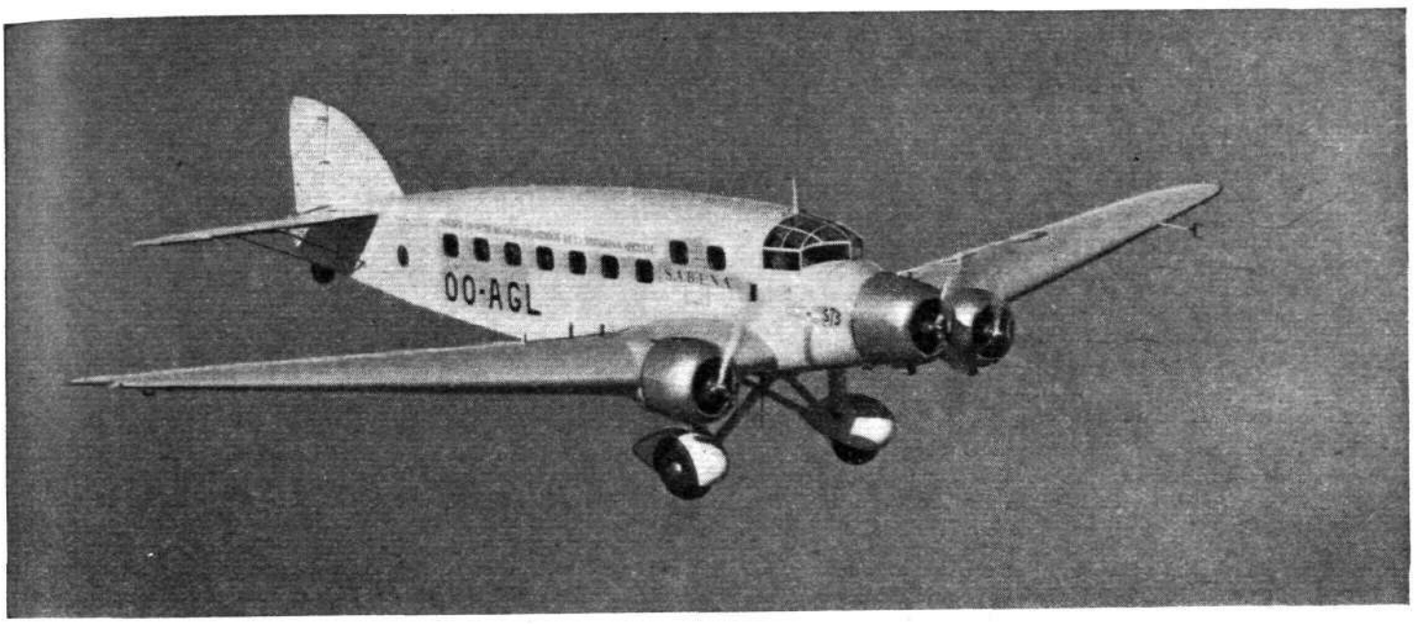
Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

Apr. 9. "Possible Effects of Flying on Future Generations." Debate at Women's Engineering Society, 20, Regent St., London.
Apr. 11-20. Second Annual Skybird League Rally and Model Competition.
Apr. 15. "Commercial Aircraft." R.Ae.S. Lecture by Capt. G. de Havilland.
May (Date not yet fixed). Wilbur Wright Lecture. R.Ae.S. by Mr. Donald W. Douglas.
May 5. R.Ae.S. Garden Party, Fairey Aerodrome Great West Road.
May 19. Deutsch de la Meurthe Cup, Aero Club de France.
May 23. Jubilee Air Ball, Air League of the British Empire, at the Dorchester Hotel, London.
May 25. Empire Air Day, Air League of the British Empire.
May 29. Household Brigade Flying Club. Night-Flying Demonstration, Heston.
June 1. Brooklands "At Home."
June 1-15. Lisbon Aero Show.
June 8. London Aeroplane Club. Garden Party, Hatfield.
June 15. R.A.F. Flying Club Annual Display, Hatfield Aerodrome.
June 15. Bristol & Wessex Aeroplane Club, S.B.A.C. Challenge Cup, Whitchurch.
June 16. Scottish Flying Club Display, Renfrew.
June 29. Royal Air Force Display, Hendon.
July 1. S.B.A.C. Display, Hendon.
July 13. Opening of Leicester Municipal Airport.
July 20. Opening of Brighton, Hove and Worthing Municipal Airport, Shoreham.
July 28. Private Owners' Garden Party, Ratcliffe, Leicester.
Aug. 24-25. Third International Flying Meeting, Lympne.
Sept. 6-7. King's Cup Air Race.
Sept. 15. Gordon Bennett Balloon Race, Warsaw.
Oct. 12-28. International Aircraft Exhibition, Milan.

COMMERCIAL AVIATION

—AIRLINES —— AIRPORTS—



S.A.B.E.N.A.'s LATEST : The Savoia-Marchetti S.73 being demonstrated near Croydon. At the time when this picture was taken by a *Flight* photographer the machine was carrying most of this country's aviation correspondents !

CROYDON

A Sea Fog Only : The Grand National Charters : A Prime Minister's "Faux Pas" : Seeing the World : Spring Services

ACCORDING to the newspapers, thick fog in the Channel and Southampton Water brought shipping to a standstill on one day last week. Dozens of ships of all shapes and sizes, from Channel steamers and fishing smacks to troopships from India, and Transatlantic liners, were involved in the sea traffic chaos.

Commercial aviation was completely unaffected, and all Continental services ran to schedule, including sundry "after dark" arrivals at Croydon and the German night mail on Wednesday night.

Communication with the Isle of Wight was kept open by the services of Spartan Air Lines, Ltd. Shipping magnates must often wrinkle anxious brows and ask themselves "What of the future?" on such occasions.

Amongst those present at the demonstration of the Savoia-Marchetti last Thursday were Signor Grandi, the Italian Ambassador, and Baron de Cartier de Marchienne, the Belgian Ambassador. Sir John Salmond, Mr. Woods Humphery, and Mr. F. G. L. Bertram, of the Air Ministry, also attended, and all, I believe, flew in the machine.

The Grand National brought the usual crowd in bowler hats and race glasses, and many of the older gentlemen were dressed to resemble old-time cab drivers in gala clothes. Two fully-loaded "Scyllas" went to the National piloted by Capts. Horsey and Perry, as well as two D.H. 86 machines. The routine Croydon-Speke Railway Air Services machine carried Lord and Lady Londonderry and Lady Margaret Stewart. Olley Air Service, British Air Transport, Commercial Air Hire, Wrightways, and, I believe, Air Taxis also sent aeroplanes to Speke. A couple of privately owned French Potez monoplanes arrivel at Croydon and cleared Customs before proceeding to Liverpool.

It appeared quite natural for Sir John Simon and Mr. Anthony Eden to take special machines from Imperial Airways for their Paris and Berlin flights, considering the importance of the occasion. Somebody, however, questioned the Prime Minister in the House of Commons as to whether the lowest tender from several aircraft operating firms was sought and accepted. Mr. Ramsay MacDonald avoided the frying pan, but dropped gently into the fire when he replied that no unnecessary expense was involved and that there was no regular service to Berlin on Sundays. Perhaps the cream of the jest is that this reply apparently satisfied his questioner. All through the winter K.L.M. and D.L.H. have run regular Sunday London-Berlin services! It seems a little hard on these firms for the Prime Minister to announce in the House of Commons that their very convenient services do not exist at all.

One nice sunny morning recently I saw two "Scyllas," one "Heracles," one "Argosy," one Bolton and Paul, two D.H. 86s, and one Westland "Wessex," all sunning themselves on the tarmac before a perfectly empty Imperial Airways hangar. Perhaps spring cleaning was in progress.

Two naval commanders on leave decided they really ought to see something of the wide world, so they went to Capt. Olley about it. Between March 16 and 28 he showed them quite a lot. Leaving Croydon, they flew *via* Paris to Carcasonne, Barcelona, Alicante, Oran, Sidi Ben Abbas, Fez, Casablanca, Tangiers, Seville, Madrid, and Bordeaux, as well as making flights over the Atlas Mountains and into the depths of the Sahara.

Monday, April 1, saw the inauguration of spring time-tables. One new service was the Imperial London to Budapest, operated with "Diana" class machines. The first was flown by Capt. Percy, who created mild alarm and despondency by arriving at the Airport in a white cap cover exactly one month too early. Did someone remember that Monday was the first of April? Anyway, the machine was held up by weather at Cologne.

At the same time—8.0 a.m.—the K.L.M. London-Prague service also came into force, and the Czechoslovakian Ambassador in London took the opportunity to travel therein to Prague.

From Karachi comes a true tale of an American Imperial Airways passenger who bought an elephant during the breakfast halt at Karachi. Waiters in those parts will soon grow accustomed to an order such as "Some more coffee, please, and—er—bring a couple of tigers, will you?" A. VIATOR.

Commercial Aviation

HESTON

Airline Prospects during 1935 : A Control Officer Appointed : D/F this Month : The Aintree Rush : An Air Yacht for Egypt

JANUARY of last year saw the birth of summer and winter air-line operation at Heston with the first London services of Jersey Airways, Ltd. During 1934 7,000 passengers were carried between Heston and Jersey, over 1,900 passengers between Heston and the French coastal resorts, and 2,875 passengers between Heston and Ryde.

This year will see an increased number of air-line companies using Heston as their terminus. The consequent need for traffic control on a larger scale has led to the appointment of Wing Cdr. R. G. D. Small as chief control officer, with effect from April 15. Wing Cdr. Small joined the R.F.C. on its formation in 1912, went overseas in 1914 and commanded the 54th Night Wing, being twice wounded in the war. He was invalided out of the Service in 1933.

Pending the construction of the permanent wireless station for Heston, a mobile transmitter, with Bellini-Tosi direction-finder, has been erected and will commence operations on April 15. It is understood that "Notices to Airmen" will shortly be published giving full particulars of the Heston radio control area.

Faster Services

Time-tables are being speeded up. As already recorded, Jersey Airways have taken delivery of the third of their six new D.H.86s, which reduce the London-Jersey passage by half an hour. North-Eastern Airways, a new company whose plans were set forth in *Flight* of March 14, will use Airspeed "Envoys"; the Portsmouth, Southsea and Isle of Wight Aviation, Ltd., details of whose plans were given in *Flight* of March 21, will use Airspeed "Envoys" and "Couriers"; Spartan Airlines will use the well-tried three-engined Spartan "Cruiser"; and B.A.N.Co. will use D.H. "Dragons" and Trimotor Fords. The average air-line cruising speed from Heston will thus rise to 126 m.p.h., a 15 per cent. improvement on the 1934 figure.

After April 15—which appears to be a critical date—Jersey Airways and Spartan Airlines will occupy the large new hangar, with 100ft. entrances at either end, which was erected on the west side of the airport at the beginning of this year. Jersey Airways, which at present run once daily each way, will start a twice-daily service to St. Helier on June 1. From about this date, too, services will call on request at Alderney, where a fully equipped aerodrome is now being prepared. Jersey Airways' present service from Jersey to Rennes will be discontinued at the end of this month, but arrangements are being made to run to some other point in France to enable passengers to connect with air-lines to the south without the necessity of passing through Paris. The airport of Jersey is not likely to be ready for use this year, and in the meantime the necessary beach landings will, as usual, be restricted by the tides, which do not allow of more than two services a day.

The bulk of B.A.N.Co. operations will this year be centred on the Brighton, Hove and Worthing airport, to be opened on July 20. The company plans, however, to run from Heston to Deauville and Le Touquet; the former daily, in August only, and the latter on all days except Tuesdays and Thursdays, commencing on June 1. An Easter service to Le Touquet will be operated by this company from April 19 to 23 inclusive at a return fare of £5 5s. Three outward services will run on the Thursday and one on the Friday, Saturday and Sunday. Two return services will run on the Monday and three on the Tuesday.

In 1935 two distinct services will run from Heston to the Isle of Wight. P.S. and I.O.W.A. are running to Ryde and Shanklin from April 15, and Spartan Airlines to Cowes and Bembridge from April 14. Both companies will charge a return fare of 45s., and the former have instituted a cheap day return at 38s. 6d. Spartan Airlines will operate three services daily each way on Mondays, Fridays, Saturdays and Sundays, and two daily on Tuesdays, Wednesdays and Thursdays, with the exception of the Easter Thursday and Tuesday, when three services will be run. Spartan Airline passengers will be collected at the Airway Terminus, Victoria Station, and P.S. and I.O.W.A. passengers at the Victoria Coach Station.

Fifteen or more aeroplanes were booked to leave Heston for the Grand National. B.A.N.Co. ran a special service which included all transport and admission to the reserved carriage enclosure. Birkett Air Service sent five light aeroplanes on charter to the Press, B.A.N.Co. supplied several small aeroplanes on charter, and Air Commerce, Ltd., used a "Dragon."

Viscount Furness has purchased a D.H. "Rapide" fitted up in considerable luxury. Capt. D. P. Cameron, who has succeeded Mr. T. Campbell Black as Lord Furness's personal pilot, left Heston last Wednesday in this aeroplane for Paris *en route* for Cairo, where he will deliver it to its owner. By halving the seating accommodatieon a high degree of comfort for four passengers has been obtained. It had been flown from Hatfield on the previous evening, and had made a night landing with the aid of its Harley landing light.

Leicester is Open

The Leicester muncipal aerodrome near Braunstone has now been licensed, and the Leicestershire Aero Club is in occupation.

Croydon Mourns Bajac

MEN of half a dozen nations are mourning the death of a friend—Robert Bajac, Chief Pilot of Air France, a man universally admired in commercial air circles and, what is more, universally liked.

Bajac met his death on Monday, when the first Air France Paris-London night mail and freight machine, which he was piloting, had to make a forced landing at Bremontiers, near Gisors, and crashed badly. Two members of the Air France staff who were on board were injured.

Bajac (writes "A. Viator") was more than a highly skilled pilot, he was also a wise counsellor. At international meetings held at Croydon, where much frothy verbiage was uttered, no one ever heard words of anything but wisdom from Robert Bajac.

He gave an impression of tremendous calm—the calm of the master craftsman, confident in himself and capable of inspiring courage in others. How much this counted for in the dark days when civil aviation yet struggled to take its rightful place in the world of transport only a few of the older men can fully appreciate.

Bajac was only thirty-eight when he died in harness, and for nineteen years he had been flying. Most of his work was on the London-Paris route, and consequently he was as well known at Croydon as at Le Bourget.

The Pacific Service

Last week Pan American Airways' training Sikorsky S-42 was flown from Miami to San Diego, California, in readiness for the first experimental Pacific flight. The supply ship *North Haven* has left San Francisco for the various island bases.

The Shetland Service

It appears probable that Highland Airways' Shetland service will start towards the middle of next month, using a landing ground at Sumburgh for Shetland and using Aberdeen as a base. Shetland has made the necessary offer of support to the Air Ministry for wireless and D/F equipment.

Faster D.L.H. Services

According to the summer time-table of Deutsche Luft Hansa, which was published last week, internal services will be considerably faster, and several new services will be put into operation.

The Berlin-Hamburg route, for instance, will be flown at an average speed of about 180 m.p.h.—presumably Junkers Ju 160s or Heinkel He 70s will be used—and no large German city is more than three hours' flying from the capital. There will be a through service from Berlin to Madrid, taking a little over ten hours, daily services from Berlin to Copenhagen and to Brussels, from Hamburg to Amsterdam, and between Amsterdam, Frankfurt and Milan. Two daily services will be run between London and Berlin *via* Amsterdam and connecting with the Hamburg services.

Commercial Aviation

Blind Flying Test Extension

In order to meet certain difficulties that have arisen, particularly with regard to pilots who are operating abroad, the final date before which tests in blind flying must be passed has been extended from April 1 to July 1.

G.A.P.A.N. Lectures

The Guild of Air Pilots is considering holding a series of lectures for those who wish to take the Air Ministry examination in October next, provided there are a sufficient number of applications.

Those who are desirous of joining the proposed classes are asked to apply at once to the Clerk, Guild of Air Pilots, 61, Cheapside, London, E.C.2, so that the lectures may begin immediately.

A Punjab-Kashmir Air Service

The Himalayan Transport and Survey, Ltd., is organising an air service between Lahore and Srinagar. At present the journey by train and car takes at least twenty hours, and the usual time taken by train and bus is thirty hours. The air service should cover the distance in 135 minutes, and two services will be run daily, one of which is expected to link up with the Karachi-Lahore service.

Himalaya Air Transport and Survey, Ltd., who operate from New Delhi, are taking delivery of two second-hand machines, a "Moth" and a "Fox Moth," from Aircraft Distributors, Ltd., of London.

K.L.M.'s Summer Services

According to the summer time-table, which has just been published, K.L.M. are now running no fewer than four services to and from Amsterdam, and after May 1 there will be five services in operation. The Liverpool-Hull-Amsterdam service starts on May 1, leaving Liverpool at 10.20 a.m. and Amsterdam at 4 p.m. Connections can be made with most of the cities of Central Europe. For the present, at any rate, no other airports are to be touched in this country, though both Yeadon and Doncaster have been in negotiation.

S.A.B.E.N.A.'s Latest

With their new Savoia-Marchetti S.73 several services operated by S.A.B.E.N.A. will be very much speeded up this year. Brussels, for instance, will be reached in 75 minutes, compared with the two hours scheduled last year, and Ostend will be reached in 45 minutes when the type, which was illustrated in *Flight* of December 20, is put on this new summer service, opening on April 20. Three of these machines were originally ordered by the company and, after they have received their baptism on the European routes, similar machines will be used for the Congo mail service.

Last week the company staged a demonstration with their first S.73 at Croydon. The machine will undoubtedly be one of the quietest passenger machines in European service, and compares favourably with the Imperial "Heracles" and "Scylla," which have always been considered to be the last word in aural luxury. Of course, it was difficult, having no view of the pilot's dashboard and no cabin air speed indicator, to be certain that the machine was flying at cruising speed, but conversation could be carried on across the cabin in normal tones. For the passengers in the "first-class deck"—to wit, those four placed just behind the pilots and more or less in line with the wing engines—there was a certain amount of vibration, but further back this was almost negligible.

According to the manufacturer's figures, the S.73 stalls, flaps down, at 57 m.p.h., and certainly the landing speed, allowing for a 10 m.p.h. wind, did not appear to be any higher than a mile a minute, while the approach was not too flat. The split flaps extend out to the ailerons and must present a useful surface, apart from any extra lift they may provide. The maximum speed is given as 210 m.p.h. and the cruising speed as 180 m.p.h. with three Gnome-Rhône 600 h.p. engines, and 9,840ft. is reached in twelve minutes. One of the more interesting features of the machine is the semi-enclosed tail wheel with hinged fairing flaps to allow full movement while taxying. Eighteen passengers are carried with pilot, first officer, operator and mechanic. A thermostatically controlled heating system is used, and last week the thermostat had its own ideas about blood heat. At a very considerable height the passengers visibly perspired, but this is a fault in the right direction.

Seven examples have also been purchased by Ala Littoria, the Italian company. A photograph appears on p. 373.

Safer to Australia

In the new Australian civil aviation programme the Port Darwin-Melbourne route will be marked with beacons at fifty-mile intervals, and Darwin, Cootamundra, Cloncurry and Brisbane aerodromes will be equipped for night flying.

According to a Reuter message, "shark-proof" collapsible boats are carried on all the Singapore-Darwin D.H.86s, which, incidentally, have had their servo rudders removed, on the advice of the Air Ministry, since the accident at Longreach, making the machines less sensitive in directional control, and, consequently, safer under blind flying conditions.

A French North Atlantic Service?

Speaking at a luncheon in Paris last week, M. Coutré, the head of the French Air Ministry, remarked that the experimental period of the South American service was now over, and that they were ready now for the North Atlantic. The Air Ministry is already considering the alternative routes, and M. Coutré suggested an international company.

Incidentally, it is reported that a company, known as the Great Lakes Newfoundland Atlantic Corporation, Ltd., has been formed, with a capital of £2,000,000, to establish a regular service between Galway Bay, Ireland, and Mortier Bay, Newfoundland.

Cutting Across the Country

Crilly Airways, who recently started a daily service between London and Doncaster, have opened a new line cutting, very sensibly, across the main channels of surface communication. Using the new Leicester municipal airport near Braunstone as a base, two D.H. "Dragons" leave for Norwich and Bristol at 9.30 a.m. and again for Norwich at 5 p.m. and for Bristol (until April 20) at 3.45 p.m. Return services leave Norwich at 10.50 a.m. and 6.20 p.m., and leave Bristol at 10.50 a.m. and 5.5 p.m. The fares are £2 single and £3 return to either Norwich or Bristol, and passengers are allowed 30 lb. of free luggage. Freight rates are 3d. per lb. per 100 miles with a minimum of 2s. 6d. The service opened on Tuesday.

The company plans to run a service to Ireland from London next month.

A New Airline Company

United Airways, Ltd., is the title of a company which is being formed to operate from Blackpool (Stanley Park) aerodrome. The directors will be Mr. W. D. Roberts, Capt. H. H. Balfour, and Mr. W. L. Thurgood; it is understood that Whitehall Securities, Ltd., is behind the formation. Services will be run between Blackpool, Isle of Man (Ramsey) and Carlisle, and from Blackpool connection will be made with services running to London.

The company has also secured a financial interest in Northern and Scottish Airways, Ltd., who operate the Renfrew-Islay service, so that connections will be made with their services between Renfrew, Campbeltown and Islay, while other extensions are under consideration. The London terminus will be Heston airport. Mr. Thurgood, of course, is the ruling spirit of Jersey Airways, Ltd., and his company is collaborating with Spartan Air Lines under the title of Channel Islands Airways, Ltd.

Multiplication

Railway Air Services, Ltd., have announced that they intend to operate a service from London to the Isle of Man, *via* Liverpool, this year. Last year they considered that Ronaldsway was too small to be used as a stopping point for the Belfast-Glasgow D.H.86s, so presumably "Rapides" or "Dragons" will be used. United Airways, Ltd., announce that they will also run between the two, using Blackpool (Stanley Park).

During this year, therefore, there will be three companies running from the mainland to the Isle of Man. Two companies, North Eastern Airways and Aberdeen Airways, should be running by generally similar routes to Scotland. Actually, of course, Blackpool and West Coast Air Services have been operating to the Island for something like two years, and Aberdeen Airways "staked their claim" to the North in a survey flight between London and Aberdeen late last year, but the latter case is one of "first come first served," and competition is the rule of all commercial games in this year of grace.

AIR POST STAMPS

By DOUGLAS ARMSTRONG

COLLECTORS of air post souvenirs are divided nowadays into two distinct schools, the aero-philatelists and the air mail collectors. The former concern themselves primarily with stamps issued throughout the world for prepayment of air mail charges, and may be regarded to all intents and purposes as stamp collectors specialising in this particular field. Aero-philately, as its designation suggests, is a modern branch of the time-honoured cult of philately, embracing all the recognised tenets of stamp study, methods of printing, the hunt for major and minor varieties, watermarks, perforations, and the like. It appeals as much to the old-time collector of postal adhesives as to the more up-to-date seeker of air mail material.

The 30-dinar stamp in a new Persian issue shows a view of the recently established aerodrome near Teheran.

Air mail collecting, on the other hand, has very little in common with philately. Its unit is the "flown cover," to which the stamp, if any, is merely incidental; a cachet, postmark, or even a manuscript endorsement is all the same to the air mail collector provided it indicates that the missive was carried on a certain flight and constitutes a record of some noteworthy event in the history of aviation in the service of the post office.

It is really a new hobby and a thing apart from stamp collecting. Indeed, a large proportion of air mail collectors have never collected stamps except in the way described, and pursue their studies upon altogether different lines, paying attention chiefly to the aerial and postal aspects of the items that go into their collections. Both schools of collecting have a legitimate place in the scheme of things, but whereas, with the gradual passing of the air post stamp from use which must result inevitably from the introduction of flat rates for air-borne correspondence, aero-philately will tend to become merged with philately proper and possibly cease to exist as a separate entity, air mail collecting will survive as an antiquarian pursuit, illustrating and recording the rise and progress of aerial navigation from the dawn of flight down to the time, not far distant, when the aeroplane and the airship will become the most general means of transporting the mails all over the world.

No Jubilee Air Post

Owing to the refusal of H.M. Postmaster-General to sanction the use of a special stamp for the occasion, it is understood that the plan to revive the London-Windsor air post service as part of the Silver Jubilee celebrations next month has been abandoned. The decision will be deplored by air mail collectors who were keenly interested in the project.

Air Mail Society's Progress

Meanwhile, I learn that the founder of the First United Kingdom Aerial Post, Cdr. Sir Walter Windham, R.N., has accepted the position of a vice-president of the newly formed and go-ahead Air Mail Society, the membership of which is increasing by leaps and bounds.

An expert committee has been constituted in the persons of Brigadier-Gen. R. Ridgway, C.B., Miss W. Penn Gaskell, and Messrs. R. E. R. Dalwick, C. H. Greenwood, F. J. Field, T. E. Field, J. McHarg, Jnr., J. S. Davis, A. Phillips, and D. B. Armstrong (hon. secretary); they will commence work almost immediately. An exchange packet is to be circulated in the autumn, and the nucleus of a reference library is being assembled.

At the last meeting, held on March 20, a valuable collection of unused air post stamps was displayed by Mr. R. E. R. Dalwick, while Major Alan Goodfellow showed a complete, and possibly unique, collection of covers flown by all the pilots who entered for the London-Melbourne Race last year.

The President, Dowager Viscountess Downe, has promised to exhibit her specialised collection of Colombian air stamps on April 10, when the Society will meet and dine at Pagani's Restaurant, London, at 6.15 p.m.

Glasgow-Lerwick Air Mail

The most notable event of the past month in connection with British inland air mails was the inauguration on March 26 of a bi-weekly air post service between Lerwick (Shetland Islands) and Glasgow, operated by Highland Airways, Ltd. It involves the co-operation of railway, steamship, and aeroplane, and is the first of its kind to be instituted in Great Britain.

Persia's Aeriai Progress

As an instance of the development of modern Persia under the new régime, the 30-dinar value of a handsome new set of postage stamps commemorating the tenth anniversary of the accession of the Shah Rizah Pahlavi shows a view of the new aerodrome near Teheran. The stamp is illustrated on the left.

THE INDUSTRY

FUTURE OF THE KLEMM

A new company, the British Aircraft Manufacturing Co., Ltd., has been formed to acquire as a going concern the British Klemm Aeroplane Co., Ltd., of Hanworth Aerodrome, Middlesex. The vendor company, of course, manufactures the well-known Klemm "Swallow" and "Eagle," both of which types are now in commercial production.

On the board of directors will be Air Commodore P. F. M. Fellowes.

THE PASSING OF PRATTS

In 1888, the year following Queen Victoria's Jubilee, a group of oil merchants banded together in England and formed the company which ultimately became the Anglo-American Oil Company and sold Pratts motor fuel. But the old order changeth, and, as from Friday next, the name of Pratts will give way to that of "Esso." This will mean that all petrol sold by the Anglo-American Oil Co., both in this country and abroad, will be sold under the same name. Coincident with this change is the introduction of "Essolene" to replace "Pratts Commercial."

NEW COMPANIES

CHELMSFORD AIRPORT LTD., 8, Budge Row, Queen Victoria Street, E.C.4. Capital £1,000 in 800 6% cumulative preference shares of £1 each and 4,000 ordinary shares of 1s. each. Objects: To acquire any lands or other properties and to lay out and develop the same as aerodromes, airports, athletic and sports grounds, etc. The directors are:—Sydney E. Taylor; John Rimmer; and Wm. M. Paterson.

PHILLIPS AND POWIS AIRCRAFT LTD., The Aerodrome, Woodley, Reading, Berks. Nominal capital of £125,000 in 5s. shares. Objects: To acquire the undertaking and assets of Phillips and Powis Aircraft (Reading), Ltd., to carry on the business of manufacturers of aero-engines and aircraft of every description, and all parts and accessories thereto; to promote, assist and encourage aerial navigation in all its forms, the study of aeronautics, the development of all sciences connected therewith, and the design and construction of aerial conveyances of every description, etc. The first directors (to number not less than three nor more than seven) are:—Charles O. Powis, aeronautical engineer (chairman of Phillips and Powis Motors, Ltd.); Frederick G. Miles, aircraft designer; and George W. G. Allen (governing director of John Allen and Sons (Oxford), Ltd.). Secretary: W. E. Graeme Brown. Solicitors: Charles Russell and Co., 37, Norfolk Street, W.C.2.

DUBLIN AIR FERRIES, LTD., Capital £500 in £1 shares. Objects: To acquire certain lands at Kildonan, Finglas known as Kildonan Aerodrome, and all or any part of the assets and liabilities of the business; to manufacture, repair and deal in aircraft of all kinds, etc. The subscribers (each with one share) are:—Reginald G. Williams, Kildonan Aerodrome; and S. Mary Williams. The first directors are not named.

BRITISH COASTAL AIRWAYS, LTD. Nominal capital of £1,000 in £1 shares. Objects: To carry on the business of aerial transporters and air travel enquiry and booking agents, etc. Directors: Geo. Tulloch Gillie, 200, St. Vincent Street, Glasgow; and John Tulloch Gillie (permanent managing director).

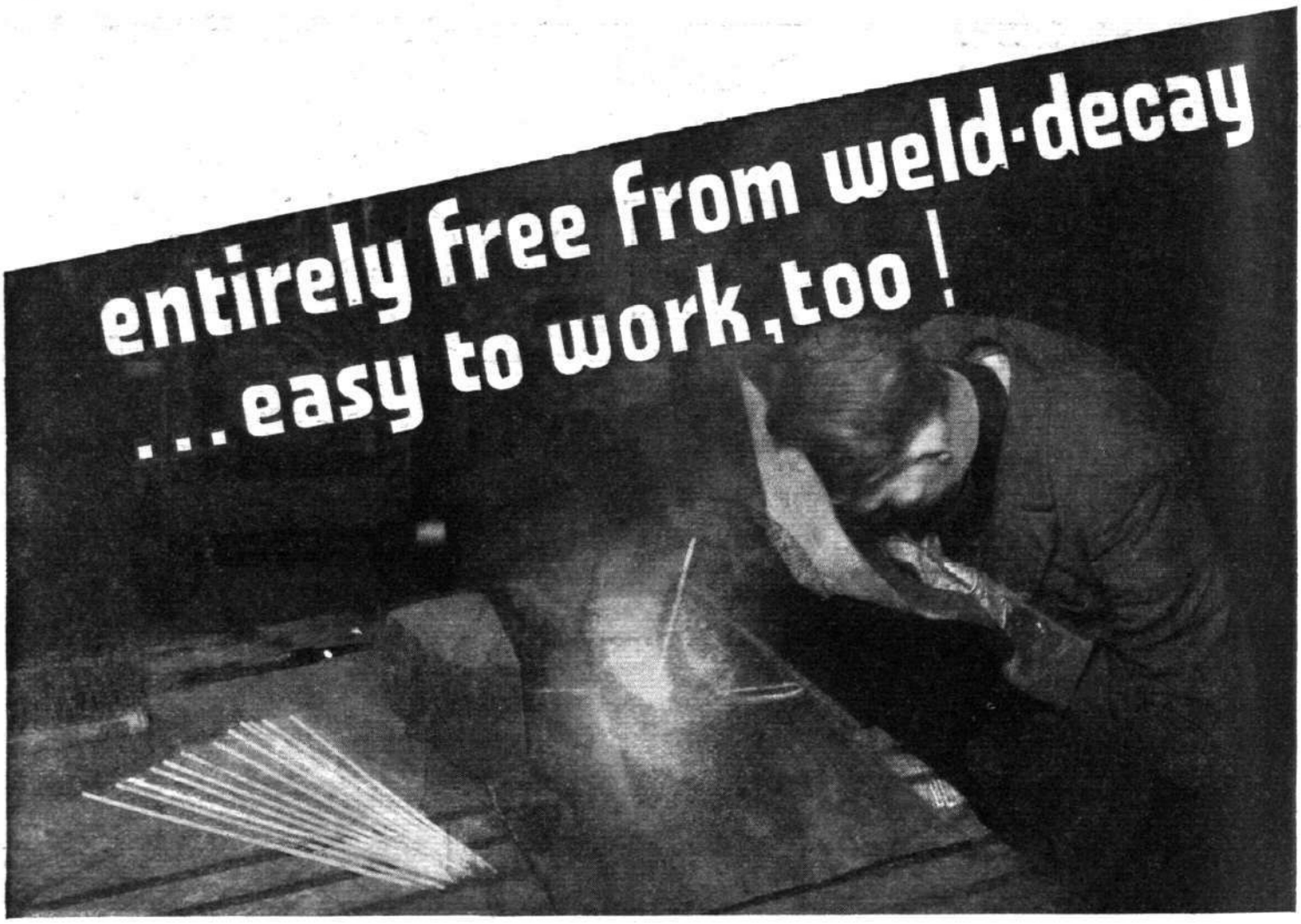
C. C. WAKEFIELD & COMPANY (I.F.S.), LTD. Registered in Dublin with a nominal capital of £15,000 in 10,000 5 per cent. preference and 5,000 ordinary shares of £1 each. Objects: To carry on the business of manufacturers, exporters, etc., of lubricating and other oils. Directors: The Rt. Hon Viscount Wakefield of Hythe; Walter R. Graham; and James Brown.

INCREASES OF CAPITAL

MARSHALLS FLYING SCHOOL, LTD., 19, Jesus Lane, Cambridge. The nominal capital has been increased by the addition of £29,700 in £1 shares beyond the registered capital of £300.

AIR COMMERCE, LTD., 22, Aldermanbury, E.C.2. The nominal capital has been increased by the addition of £3,000 in £1 ordinary shares beyond the registered capital of £1,000.

INSURANCE FLYING CLUB, LTD., 7, Union Court, London, E.C.2. The nominal capital has been increased by the addition of £500 in ordinary £1 shares beyond the registered capital of £500.



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FLIGHT

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MISCELLANEOUS ADVERTISEMENTS

IMPORTANT NOTICE

Owing to the Easter Holidays. the issue of "FLIGHT" for April 18th must be closed for press earlier than usual.

MISCELLANEOUS ADVERTISEMENTS for insertion in that issue can be accepted up to

First Post, MONDAY, April 15.

Aircraft and Engines For Sale

KLEMM 2-SEATER, British Salmson engine, 2 magnetos, large wheel undercarriage, 250 hours. 5 hours since top overhaul and re-paint. Very clean aircraft. £225 or near offer. Beardmore Service, Ltd., 28, Queen's Road, W.2.

FOR Sale. 40 h.p. Salmson Klemm, cruises 70, C. of A. November, 30 hrs. since top overhaul and C. of A. £225. R. Somerset, North Eastern Airways, Heston.

G.Q. PARACHUTE. New. Silk. Seat type. Quick release harness. Complete with case £42. Box No. 1029, c/o "Flight," Dorset House, Stamford Street, London, S.E.1.

218 HAWK MAJOR. Gipsy Major engine Total hours, 120. C. of A., November 1935. Navigation lights. Flaps. Smart appearance. Owner buying cabin machine. Price £725. Box 8740, c/o "Flight," Dorset House, Stamford Street, London, S.E.1.

£285 Cirrus Klemm. Very good condition. C. of A., February, 1936. Total hours, 395. R. H. Stocken, 18/20, Lower Regent Street, S.W.1. Whitehall 8845.

GIPSY I MOTH. C. of A., Jan., 1936. Engine just completely overhauled. Slots, compass, extra tank, instruments in front cockpit, light and dark blue, condition as new. £375. Bekesbourne Aerodrome, Canterbury. Tel. Bridge 60.

AEROPLANE for sale. D.H.60 X. Cirrus II engine, in first-class order. Low cash price or deferred. Box No. 4742, c/o "Flight," Dorset House, Stamford Street, London, S.E.1.

Patent and Trade Mark Agents

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